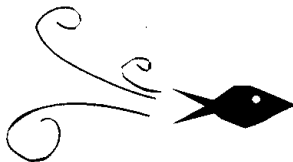
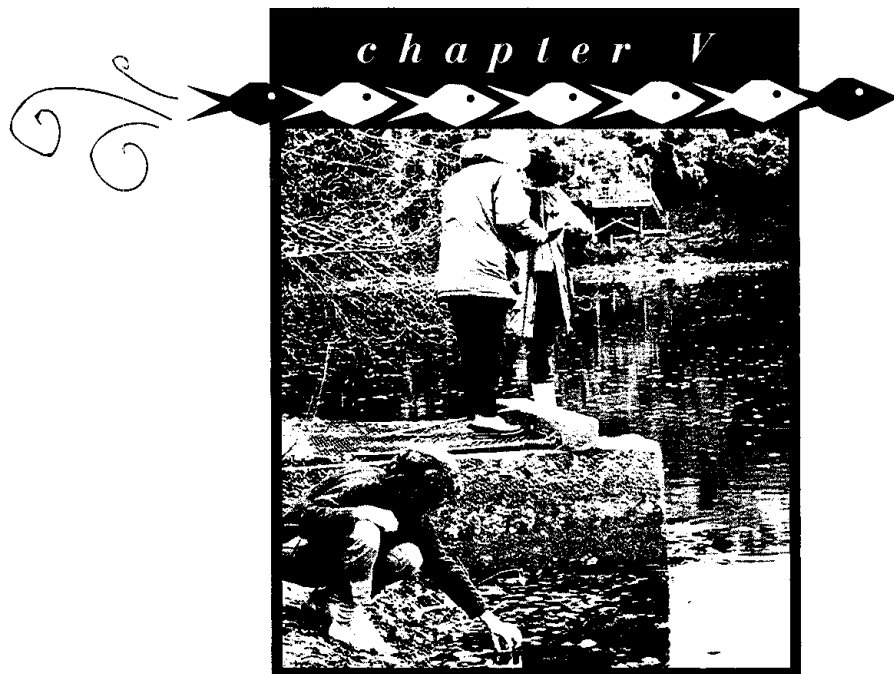


Action Plans



CHAPTER V. ACTION PLANS

Introduction

The action plans in this chapter form the centerpiece of the Comprehensive Conservation and Management Plan for the Massachusetts Bays. Successful implementation of these plans is expected to lead to the restoration and protection of the Bays' water quality, living resources, and fish, shellfish, and wildlife habitat.

While some of the plans' prescribed actions are mitigative in nature, overall the emphasis is on *prevention*, in recogni-

tion of the simple truth that it will cost far more to clean up pollution later than to prevent it now. The plan is also based on a premise of *shared responsibility* among all of us in the Massachusetts Bays region who use and enjoy the Bays' bountiful resources. It recognizes that fish, wildlife, water, and pollutants cross jurisdictional lines, and establishes a framework based on a partnership among government agencies (federal, state, regional, and local), nonprofit organizations, the private sector, and citizens.

In all, there are 15 major action plans, as follows:

CCMP ACTION PLANS

- | | |
|---|--|
| 1. Protecting Public Health | 9. Managing Dredging and Dredged Materials Disposal |
| 2. Protecting and Enhancing Shellfish Resources | 10. Reducing Beach Debris and Marine Floatables |
| 3. Protecting and Enhancing Coastal Habitat | 11. Protecting Nitrogen-Sensitive Embayments |
| 4. Reducing and Preventing Stormwater Pollution | 12. Enhancing Public Access and the Working Waterfront |
| 5. Reducing and Preventing Toxic Pollution | 13. Planning for a Shifting Shoreline |
| 6. Reducing and Preventing Oil Pollution | 14. Managing Local Land Use and Growth |
| 7. Managing Municipal Wastewater | 15. Enhancing Public Education and Participation |
| 8. Managing Boat Wastes and Marina Pollution | |

Each major action plan contains a series of individual recommended actions, each of which is divided into eight sections: Rationale, Responsible Agent(s), Implementation Strategy, Legislation Required, Estimated Cost, Potential Funding Source(s), Target Date, and Further Information. These sections document the need for each action and describe the organizations, strategies, and timetables recommended for implementing them. Estimated costs and potential funding sources are identified as well. For more extensive information on funding opportunities, the reader is referred to the MBP report entitled, *Financing the Massachusetts Bays CCMP: Federal, State, and Local Funding Sources and Mechanisms* (December 1994). In addition, Chapter VII of this CCMP provides a summary of this report.

To demonstrate implementation of CCMP actions, the Massachusetts Bays Program has funded over 30 projects, including the five-year Mini-Bays Projects in Plum Island Sound, the Fore River Embayment, and Wellfleet Harbor. A list of these projects, costs, and contacts is included in Appendix I. A CCMP companion document that provides more information on the demonstration projects, as well as a series of individual fact sheets, are in preparation. These will be available in early summer, 1996.

A matrix of the 15 major action plans, individual recommended actions, and implementing agents follows.

SUMMARY OF RECOMMENDED ACTIONS

Responsible Agency	ACTION PLAN #1 Protecting Public Health	ACTION PLAN #2 Protecting and Enhancing Shellfish Resources
Department of Public Health (DPH)	1.1 Establish a central clearinghouse program for all beach testing and closure information generated for Massachusetts' coastal public beaches.	
Division of Marine Fisheries (DMF)		<p>2.1 Conduct three (3) <i>Sanitary Survey Training Sessions</i> annually -- one each on the North Shore, Metro Boston/South Shore, and Cape Cod -- to educate local shellfish constables and health officers on the proper techniques for identifying and evaluating pathogen inputs into shellfish harvesting areas.</p> <p>2.2 Develop and administer a local <i>Shellfish Management Grants Program</i> to help communities finance the development and implementation of effective local shellfish management plans.</p>
Shellfish Bed Restoration Program (SBRP)		2.3 Continue and expand the innovative <i>Shellfish Bed Restoration Program</i> to restore and protect shellfish beds impacted by nonpoint source pollution.

SUMMARY OF RECOMMENDED ACTIONS

Responsible Agency	ACTION PLAN #3 Protecting and Enhancing Coastal Habitat
Municipalities	<p>3.1 Prepare and implement an EOEA - approved <i>Open Space Plan</i> to preserve and protect key wetlands, floodplains, fish and wildlife habitat, and other ecologically- and recreationally-important natural resource areas.</p> <p>3.2 Adopt and implement a local <i>Riverfront District Bylaw</i> to maintain river water quality, preserve fish and wildlife habitat, and protect downstream nursery and shellfish resources.</p> <p>3.3 Work cooperatively with neighboring communities, EOEA agencies, and other interested parties to develop proactive, long-term <i>ACEC Management Plans</i> to preserve and protect these vital resource areas.</p> <p>3.4 Adopt and implement a local <i>Wetlands Protection Bylaw</i> to supplement the state Wetlands Protection Act Regulations.</p> <p>3.5 Prepare and implement ecosystem-based <i>Barrier Beach Management Plans</i> to promote responsible use and protection of these critical coastal resources.</p> <p>3.6 Employ full-time, professionally-trained conservation staff to provide ongoing technical and administrative support to local Conservation Commissions.</p>
Department of Environmental Management (DEM)	<p>3.7 Develop and implement <i>Resource Management Plans</i> for all DEM-owned coastal properties.</p> <p>3.8 Develop and promote the use of river basin planning reports to facilitate responsible water resources planning and management at the local and regional levels.</p> <p>3.9 Acquire and restore undeveloped coastal properties that offer outstanding living resources habitat and public recreation opportunities.</p>
Department of Environmental Protection (DEP)	<p>3.10 Complete the statewide inventorying and mapping of coastal and inland wetlands, and provide local Conservation Commissions with: 1) accurate base maps depicting wetland boundaries, and 2) instruction on proper wetland map interpretation and use.</p>
Department of Fisheries, Wildlife and Environmental Law Enforcement (DFWELE)	<p>3.11 In collaboration with the Riverways Program, prepare an up-to-date inventory of anadromous fish runs in the Massachusetts Bays region and develop a strategy to prioritize, restore, and maintain these runs.</p> <p>3.12 In collaboration with the Riverways Program, develop and implement a citizen-based <i>Fishway Stewardship Program</i> to restore and maintain anadromous fish runs along the Massachusetts Bays coast.</p>
Executive Office of Environmental Affairs (EOEA)	<p>3.13 Continue the innovative <i>Wetlands Restoration and Banking Program</i> to restore and protect degraded coastal and inland wetlands.</p>
Environmental Protection Agency (EPA), National Marine Fisheries Service (NMFS), and U.S. Army Corps of Engineers (ACOE)	<p>3.14 Continue and expand current efforts to support eelgrass habitat protection and restoration in Massachusetts and Cape Cod Bays.</p>

SUMMARY OF RECOMMENDED ACTIONS

Responsible Agency	ACTION PLAN #4 Reducing and Preventing Stormwater Pollution
Municipalities	<p>4.1 Adopt subdivision regulations that require the incorporation of stormwater runoff best management practices (BMPs) into all new development plans.</p> <p>4.2 Implement best management practices to mitigate existing stormwater discharges that are causing or contributing to the closure of shellfish harvesting areas and swimming beaches.</p>
Department of Environmental Protection (DEP)	<p>4.3 In collaboration with Regional Planning Agencies, Natural Resources Conservation Service/MassCAP (formerly U.S. Soil Conservation Service), and Massachusetts Coastal Zone Management Office, 1) disseminate the <i>Nonpoint Source Management Manual</i> and <i>Urban Best Management Practices for Massachusetts</i>, and 2) sponsor public workshops to educate local officials about best management practices and performance standards for controlling stormwater runoff.</p> <p>4.4 Develop a coordinated and streamlined regulatory system within DEP to assure effective implementation of the stormwater components of the Massachusetts Clean Water Act, Wetlands Protection Act, and Federal Stormwater Program (Federal Clean Water Act, Sections 401 and 402).</p>
Environmental Protection Agency (EPA)	<p>4.5 Reduce stormwater pollution in the Massachusetts Bays watersheds through: (a) technical assistance to communities in developing comprehensive stormwater management programs; and (b) National Pollutant Discharge Elimination System (NPDES) compliance for industrial stormwater dischargers. Targeted areas are the lower Charles River for the stormwater management programs and the Neponset River for the industrial stormwater dischargers.</p>
Massachusetts Highway Department (MHD)	<p>4.6 Prepare an <i>Environmental Manual</i> to complement the <i>Highway Design Manual</i> and provide for the integration of environmental concerns (including stormwater management) into all phases of highway project planning, design, construction, and maintenance.</p> <p>4.7 As part of its forthcoming pollution prevention plan, develop a <i>Stormwater Pollution Mitigation Program</i> to identify, prioritize, and correct existing stormwater pollution problems associated with state highway drainage facilities.</p> <p>4.8 Sponsor annual workshops to train local public works personnel on the proper use of stormwater runoff best management practices.</p>
Massachusetts Highway Department (MHD) and Metropolitan District Commission (MDC)	<p>4.9 Require the use of on-site stormwater best management practices as a precondition to the permitting of private property tie-ins to state drainage facilities.</p>

SUMMARY OF RECOMMENDED ACTIONS		
Responsible Agency	ACTION PLAN #5 Reducing and preventing Toxic Pollution	ACTION PLAN #6 Reducing and Preventing Oil Pollution
Municipalities	<p>5.1 Adopt and implement the following set of regulations to ensure the safe use, storage, and disposal of toxic and hazardous materials: 1) <i>Toxic and Hazardous Materials Regulation</i>, 2) <i>Underground Storage Tank Regulation</i>, and 3) <i>Commercial/Industrial Floor Drain Regulation</i>.</p> <p>5.2 Establish <i>Household Hazardous Waste Collection Programs</i> for difficult-to-manage hazardous products to ensure their proper disposal on a regular basis.</p>	<p>6.1 Establish and promote the use of <i>Used Motor Oil Collection Facilities</i> to ensure the proper collection and disposal of used motor oil from do-it-yourself oil changes.</p>
Department of Education (DOE)	<p>5.3 In collaboration with the Department of Environmental Protection, develop and offer continuing education courses on hazardous materials management to create a pool of trained "HazMat Specialists" at the local level.</p>	
Department of Environmental Protection (DEP)		<p>6.2 In collaboration with the U.S. Coast Guard, EPA, and NOAA, implement the <i>Policy on the Use of Oil Spill Chemical Countermeasures (Dispersants)</i> to protect coastal resources from the adverse effects of oil spills.</p>
Executive Office of Environmental Affairs, Municipalities, & Private Sector Partnership	<p>5.4 Form partnerships to facilitate the safe management of hazardous products, emphasizing reduced products use and recycling wherever possible.</p>	
Environmental Protection Agency (EPA)	<p>5.5 Reduce and prevent toxic pollution through targeted National Pollutant Discharge Elimination System (NPDES) permitting of significant discharges in the Massachusetts Bays; in particular, oil tank farms on Chelsea Creek and the Island End River.</p>	
EOEA Office of Technical Assistance for Toxics Use Reduction (OTA)	<p>5.6 Continue to perform on-site assessments and provide instructional materials to help businesses and industries in the Massachusetts Bays region reduce the use of toxic substances.</p>	
US Coast Guard (USCG)		<p>6.3 In collaboration with other federal, state, and local agencies, continue to update and implement the Massachusetts coastwide <i>Area Contingency Plans</i> to assure a rapid and effective response to discharges of oil and other hazardous substances into the marine environment.</p>

SUMMARY OF RECOMMENDED ACTIONS

Responsible Agency	ACTION PLAN #7 - Managing Municipal Wastewater		
	7A. Managing Centralized Wastewater Treatment Facilities	7B. Managing On-Site Sewage Disposal Systems	7C. Decentralized Wastewater Management and Treatment
Municipalities		<p>7B.1 Identify resource areas sensitive to wastewater and develop management plans appropriate to these areas, focusing on the capacities of natural systems to assimilate wastewater.</p> <p>7B.2 In cooperation with DEP, develop and implement regular inspection and maintenance (I/M) programs for on-site wastewater systems.</p> <p>7B.3 Employ full-time, professionally-trained public health staff to provide ongoing technical and administrative support to the local Boards of Health.</p>	<p>Note: Specific recommended actions for this Action Plan will be developed by the Massachusetts Bays Program and incorporated in future supplements to the CCMP.</p>
Coastal Regional Planning Agencies		<p>7B.4 Establish a Title 5 and alternative systems technical assistance program directed to local Boards of Health and health agents, systems engineers / installers, and homeowners.</p>	
Department of Environmental Management (DEM)	<p>7A.1 In collaboration with other state and federal agencies, continue to implement the Ocean Sanctuaries Act by closely monitoring all facilities plans which propose increased wastewater treatment plant discharges into an ocean sanctuary.</p>		
Department of Environmental Protection		<p>7B.5 Evaluate and build upon the centralized statewide repository for testing information on alternative technologies, to be established as part of the Buzzards Bay Project's two-year Environmental Technology Initiative Project.</p>	
Environmental Protection Agency (EPA)	<p>7A.2 Support the control of combined sewer overflows in the Massachusetts Bays watersheds, especially the lower Charles River, and target National Pollutant Discharge Elimination Systems (NPDES) permitting to implement technology- and water quality-based requirements in the Merrimack River watershed.</p>		
Environmental Protection Agency, Exec. Office of Environmental Affairs, Dept of Environmental Protection, and Coastal Zone Management Office	<p>7A.3 Work collaboratively to develop and implement an effective program for monitoring and enforcing point source discharges from wastewater treatment plants and energy-producing facilities.</p>		

SUMMARY OF RECOMMENDED ACTIONS

Responsible Agency	ACTION PLAN #8 Managing Boat Wastes and Marina Pollution	ACTION PLAN #9 Managing Dredging and Dredged Materials Disposal	ACTION PLAN #10 Reducing Beach Debris and Marine Floatables	ACTION PLAN #11 Protecting Nitrogen-Sensitive Embayments
Municipalities	<p>8.1 Work cooperatively with neighboring communities, private boatyards and marinas, and state agencies (DFWELE and CZM) to establish, promote, and maintain <i>Boat Pumpout Programs</i> in targeted embayment areas.</p> <p>8.2 With assistance from CZM and DEP, require private boatyards and marinas to implement effective storm-water runoff control strategies which include the use of pollution prevention measures and the proper design and maintenance of hull servicing areas.</p>		<p>10.1 Work cooperatively with the Massachusetts Coastal Zone Management Office, neighboring communities, and waterfront users to design and implement <i>Beach and Marine Debris Reduction Programs</i>.</p>	
Army Corps of Engineers (ACOE)		<p>9.1 Continue to monitor dredged material disposal sites in the Massachusetts Bays region and initiate the planning necessary to begin a capping demonstration project at the Massachusetts Bay Disposal Site.</p>		
Department of Environmental Protection (DEP)				<p>11.1 Strengthen <i>Massachusetts Water Quality Standards</i> to enhance and protect nitrogen-sensitive coastal embayments.</p>
Executive Office of Environmental Affairs (EOEA)		<p>9.2 Coordinate the development of a comprehensive <i>Dredging and Dredged Materials Disposal Plan</i> to improve and maintain access to the Commonwealth's ports, harbors, and channels, and to minimize adverse impacts to the marine environment.</p>		
Regional Planning Agencies, Department of Environmental Protection, and Municipalities				<p>11.2 Work collaboratively to expand upon current Massachusetts Bays Program efforts to identify nitrogen-sensitive embayments, determine critical loading rates, and recommend actions to manage nitrogen so as to prevent or reduce excessive nitrogen loading to coastal waters and groundwater.</p>

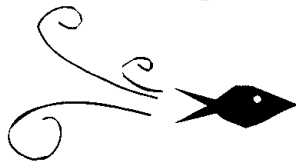
SUMMARY OF RECOMMENDED ACTIONS

Responsible Agency	ACTION PLAN #12 Enhancing Public Access and the Working Waterfront	ACTION PLAN #13 Planning for a Shifting Shoreline	ACTION PLAN #14 Managing Local Land Use and Growth
Municipalities	12.1 Develop and implement <i>Municipal Harbor Plans</i> which: 1) promote marine-dependent waterfront uses, 2) enhance public access to the water, and 3) protect habitat of shellfish and other living resources.	13.1 Adopt and implement strict development/ redevelopment standards within FEMA A and V flood hazard zones and other areas subject to coastal flooding, erosion, and relative sea level rise.	14.1 Develop and implement <i>Local Comprehensive Plans</i> (LCPS) which: 1) direct development into areas in the community capable of absorbing the impacts of growth and its associated facilities, and 2) preserve and protect the community's important natural resources.
Coastal Zone Management Office (CZM)	12.2 Enhance the Designated Port Area (DPA) program with new planning and promotional initiatives. 12.3 Establish a new technical assistance program to accelerate municipal efforts to identify and legally reclaim historic rights-of-way to the sea. 12.4 In collaboration with the Department of Environmental Management and MassGIS, prepare and distribute a statewide <i>Coastal Access Guide</i> to facilitate public access to the shoreline.		
Department of Environmental Management (DEM)		13.2 Continue to assist communities in the development of effective <i>Floodplain Management Regulations</i> .	
Executive Office of Environmental Affairs (EOEA)	12.5 In collaboration with coastal municipalities, develop and implement an <i>Access-Via-Trails</i> program to enhance public access along the coast.		

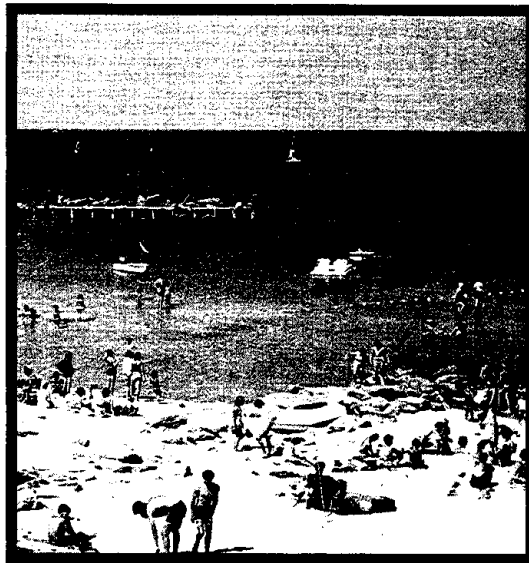
SUMMARY OF RECOMMENDED ACTIONS

	ACTION PLAN #15 Enhancing Public Education and Participation	
Responsible Agency	15A. Educating Teachers, Students, and the Public About the Bays	15B. Developing a State Nonpoint Source Education and Outreach Strategy
Department of Education (DOE)	15A.1 In collaboration with the Executive Office of Environmental Affairs, continue to develop and integrate environmental education as an important component of the curriculum in the public schools of the Commonwealth, making broad use of the Benchmarks for Environmental Education developed by the Secretaries' Advisory Group on Education (SAGEE).	
Executive Office of Environmental Affairs (EOEA)	15A.2 Continue to work closely with the Department of Education through the Secretaries' Advisory Group on Environmental Education (SAGEE) in order to develop a strategy for the implementation of the "Benchmarks for Environmental Education". Further, EOEA should continue to place a priority on the role of environmental education and provide adequate staffing to insure that appropriate state leadership is maintained. 15A.3 In cooperation with the Department of Education, continue to develop a grant relationship with the National Science Foundation and other funding agencies in order to provide technological outreach aimed at enhancing environmental literacy. The goal is to make resource and curriculum materials widely accessible and to provide ongoing coordination among the various members of the education community. The Massachusetts Bays Program represents an important aspect of the total environmental picture and should play a key role in this effort, helping to establish a unified voice to speak for environmental education concerning the Bays region.	15B.1 Develop and maintain a clearinghouse of NPS education, information, and technical assistance materials, as well as a database of available state NPS materials and programs. 15B.2 Develop and maintain a matrix, by topic, of NPS education, information, and technical assistance materials produced by state agencies and associated organizations. 15B.3 Expand upon Massachusetts Bays Program efforts and develop a strategy for NPS outreach and technical assistance state-wide that would coordinate the development and production of NPS education, information, and technical assistance materials, and provide technical assistance in order to implement NPS pollution controls.
Exec. Office of Environmental Affairs (EOEA) and the Department of Education (DOE)	15A.4 Empower exemplary teachers, administrators, and/or schools who demonstrate the competence to carry out formal and non-formal environmental education initiatives that complement the Commonwealth's environmental education programs.	
Massachusetts Bays Education Alliance (MBEA)	15A.5 Continue and expand its current efforts to build a community of educators who can ably teach about and promote the protection of the Massachusetts Bays, their shores, and watersheds.	
Coastal Advocacy Network (CAN)	15A.6 Continue to serve as a vehicle for bringing information to and from the government on environmental issues affecting the Bays, with a particular emphasis on proposed projects or regulatory changes.	
Massachusetts Bays Business and Users Group (BUG)	15A.7 Continue to provide a public forum for the exchange of information and ideas on CCMP development and implementation among the Bays' business community and resource users.	
Marine Studies Consortium	15A.8 Continue to offer undergraduate marine science and policy courses; and, through the bi-annual Massachusetts Marine Environment Symposium, bring together diverse marine interests to promote a better understanding of marine policy issues.	

chapter V



**Protecting Public
Health**



ACTION PLAN #1

PROTECTING PUBLIC HEALTH

Imagine that you have just returned from a day at the beach. While remembering the hours of fun you had in the ocean, you leaf through a local newspaper and happen upon an article about a nearby beach that was closed because of sewage contamination. Dismayed, you wonder if you risked illness by swimming in the ocean.

This scenario may not seem especially likely today, decades after the passage of strong environmental legislation. However, reports by the Natural Resources Defense Council (*Testing the Waters - A National Perspective on Beach Closings*, July 1992) and others have shown that U.S. coastal waters are not consistently monitored for contamination and that swimmers are not always adequately protected from avoidable public health risks.

In 1991, for example, U.S. ocean and bay beaches were closed or advisories were issued against swimming on more than 2,000 occasions in the coastal states that monitor beach water quality (NRDC, 1992). High levels of bacteria -- primarily from raw and inadequately treated sewage -- were responsible for the overwhelming majority of these closures and advisories.

Major sources of high bacteria levels in beach water include: inadequate and overloaded sewage treatment plants, illegal sewer hook-ups and discharges, combined sewer overflows (CSOs), stormwater runoff, faulty septic systems, and boat wastes.

In order to properly assess the threat to public health in control waters, public health officials use "indicator organisms." The indicator organism is one that, by its

presence at certain levels, "indicates" the potential for the presence of human pathogens (disease-causing organisms). The principal indicators currently in use in Massachusetts are total coliform bacteria, fecal coliform bacteria, and *Enterococcus*. The use of such indicators, as opposed to the direct measurement of the pathogens themselves, is necessary, in part, because of the lack of economical assay methods for the multitude of potential pathogens.

Pathogens of concern in coastal waters include numerous viruses, such as those responsible for gastroenteritis and hepatitis -- the two most common swimming-associated diseases worldwide -- and bacteria that can cause salmonellosis, shigellosis, and cholera. Other microbial pathogens found at varying concentrations in recreational waters include amoeba and protozoa that can cause giardiasis, amoebic dysentery, skin rashes, and "pink eye."

While most of the reported outbreaks of infectious diseases associated with bathing beaches are non-enteric (for example, skin rash), there is some risk of gastrointestinal disease from swimming in sewage-contaminated water. It is important that all beaches open to the public for swimming be monitored regularly during the swimming season, and that the monitoring data collected be centrally recorded and interpreted so that water quality problems can be properly identified and corrected so as to minimize public health risks.

The following recommended action directed to the Massachusetts Department of Public Health is a positive step toward addressing this need.

DPH ACTION # 1.1:

The Department of Public Health should establish a central clearinghouse program for all beach testing and closure information generated for Massachusetts' coastal public beaches.

RATIONALE:

The waters of all Massachusetts coastal beaches that are open to the general public for swimming must, by law, be tested bi-weekly for total coliform bacteria during the beach operating season. Currently, forty-seven coastal communities conduct some level of bacteria testing at their public beaches to ensure that water quality does not pose a significant health risk. However, it is not clear which communities employ the code-required *total* coliform standard and which use a different risk indicator, such as *fecal* coliform bacteria or *Enterococcus*. Nor is it clear which communities adhere strictly to the *bi-weekly* testing requirement. Currently, most local beach data reside solely within the individual communities. (Notable exceptions include data gathered on a regular basis by the Metropolitan District Commission (MDC) for its Boston area beaches and data exchanged informally by several neighboring South Shore communities.) Since there is no requirement to submit the data to a single, central authority, there may be a lack of uniformity in water quality monitoring and record-keeping practices from community to community and from region to region. As a consequence, it is extremely difficult to identify and compare beach water quality conditions and trends along the coast, and to target current "hotspots" or areas in decline (if any) for priority pollution abatement action.

All of this points to the need for the Department of Public Health, in coordination with other state agencies and local Boards of Health, to establish a central clearinghouse for all local and regional beach testing and closure information. Creation of a centralized, readily-accessible database on beach water quality will help local and state public health and environmental officials to identify problem areas and marshal the resources necessary to improve beach water quality, reduce public health risks, and protect the marine environment.

RESPONSIBLE AGENT(s):

The Department of Public Health's Bureau of Environmental Health Assessment (DPH/BEHA) will be the lead agent for this action, but should coordinate with the Department of Environmental Protection (DEP), Office of Coastal Zone Management (CZM), local Boards of Health, the Metropolitan District Commission, and other entities (such

as private land trusts) that are responsible for monitoring public beach water quality.

IMPLEMENTATION STRATEGY:

The DPH/BEHA will create a comprehensive database and track water quality testing and closure information for all coastal public beaches. The public beaches will be identified on a community-by-community basis with the assistance of CZM and local Boards of Health.

The DPH/BEHA will notify all coastal community Boards of Health and others responsible for beach water quality testing about the start-up of the program, and will provide each with a uniform reporting template. The water quality data collected by the Boards and others will be submitted monthly to the DPH/BEHA, where it will be entered into a central database.

The specific parameters of the database are yet to be established, but will be developed in collaboration with representative Boards of Health, DEP, CZM, MDC, and others to ensure that all relevant data are collected and reported. The data will be catalogued, interpreted, and made available for public dissemination by the DPH/BEHA staff. MBP, through its RPA/LGC technical assistants, will work closely with the DPH/BEHA staff and local officials to ensure that the data are presented in a way that is useful to beach managers in identifying potential "hot spots" for increased monitoring and remediation.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost to DPH/BEHA of establishing and maintaining this new clearinghouse function is expected to be about \$4,000 / annum, including \$2,100 for a paid intern (8 weeks) and \$2,000 in in-kind support and management by the DPH/BEHA staff. The costs to local Boards of Health, the MDC, and others collecting beach testing data will vary depending on staffing, number of water samples collected, laboratory

costs, and the cost of the monthly data transfers to DPH / BEHA. In general, these costs are expected to be minimal.

POTENTIAL FUNDING SOURCE(s):

Activities under this initiative are expected to be financed through the existing operating budgets of the DPH/BEHA, MDC, local Boards of Health, and other participants.

TARGET DATE(s):

DPH / BEHA began developing the clearinghouse program in July 1995. Work on this will continue into 1996, when the program will become a part of DPH's ongoing operation.

FURTHER INFORMATION:

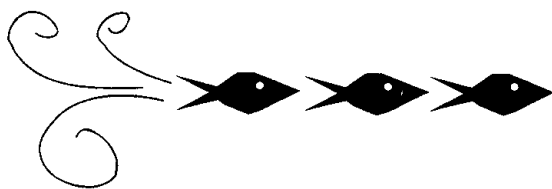
For further information and assistance, contact:

Massachusetts Department of Public Health
(Bureau of Environment Health Assessment)
(617) 727-7170

chapter V



**Protecting and
Enhancing Shellfish
Resources**



ACTION PLAN #2

PROTECTING AND ENHANCING SHELLFISH RESOURCES

Shellfish have historically been one of the most abundant and heavily utilized resources along the coast of Massachusetts Bays. Even the casual explorer of the Bays' shallow coves, estuaries, salt marshes, and coastal ponds will usually find exposed shellfish or signs of shellfish buried in the mudflats.

The inshore shellfishery of Massachusetts Bays is a major component of the region's marine fishery resource and an integral part of the state's coastal heritage. A wide array of shellfish species in the Bays are harvested for human consumption, including soft-shell clams, quahogs, oysters, bay scallops, blue mussels, and, to a lesser extent, conchs and razor clams. Between 1987 and 1990, shellfish beds in Massachusetts and Cape Cod Bays yielded an average of 60,000 bushels to commercial harvesters each year -- a catch with a market value estimated at \$3 million. In that same period, recreational harvesters collected approximately 7,000 bushels of shellfish a year, worth some \$400,000.

Unfortunately, shellfish beds up and down the coast of Massachusetts Bays are threatened by disease-causing viruses and bacteria. These pathogens enter the Bays from a variety of sources, both point and nonpoint (diffuse). Sewage treatment plants and combined sewer overflows have long been recognized as sources of contaminants. More recently, pathogen contamination has been tied to nonpoint sources such as stormwater runoff, boat sewage, and faulty septic systems.

As they filter small food particles from the water, bivalve shellfish concentrate these harmful pathogens in their stomachs. Although the pathogens probably do not affect the shellfish themselves, they *do* pose a health risk to human consumers who fail to prepare the shellfish properly. Consumption of contaminated shellfish can cause gastroenteritis, a type of food poisoning that produces nausea, vomiting, diarrhea, and abdominal cramps. An even more serious health concern is the Hepatitis A virus, which can be concentrated in shellfish and passed on to the human consumer. After an incubation period of 15 to 50 days, this life-threatening virus produces symptoms such as nausea, malaise, and jaundice, although in children and some adults it may show no symptoms at all.

Because pathogens are difficult to measure directly, their presence is measured indirectly by the presence of sewage-derived bacteria called fecal coliform. Using fecal coliform concentrations as an indicator, the Massachusetts Division of Marine Fisheries (DMF) samples, classifies, and certifies shellfish harvesting areas according to the requirements of the National Shellfish Sanitation Program (NSSP). DMF currently classifies shellfish beds as follows:

- *Approved:* monitoring indicates low levels of fecal coliform bacteria in the water overlying the shellfish bed. The shellfish are suitable for human consumption.
- *Conditionally approved:* approved except during intermittent or unpredictable pollution events, such as rainfall or combined sewer overflows. These beds require close monitoring during periods of wet weather.
- *Conditionally restricted:* shellfish harvested in these areas must be relayed to either a clean site or to a depuration plant to remove pathogens. In many cases, only specially licensed diggers are allowed to harvest from these beds.
- *Prohibited:* closed due to fecal coliform levels consistently exceeding 88 fecal coliforms per 100 ml. of seawater.
- *Management closure:* closed because DMF lacked the manpower to survey and monitor what it assumed to be an unproductive or heavily-contaminated area.

Currently, only about 60 percent of the state's shellfish beds are permanently open. More than 90,000 productive acres are closed either permanently, seasonally, or conditionally. Some areas in the Massachusetts Bays region, including all of Boston Harbor and much of the North Shore, have been closed to shellfishing or restricted for many years due to unacceptably high concentrations of fecal coliform. Other areas have seen a dramatic increase in shellfish bed closures only during the past two decades. Between 1970 and 1990, the total area of closed shellfish beds on the South Shore increased roughly threefold. On Cape Cod, the restricted

acreage doubled between 1970 and 1980, and then increased another *tenfold* between 1980 and 1990. In 1990, the Town of Ipswich lost an estimated \$3.4 million from its local economy due to restricted shellfish resources. Even coastal waters that the state has designated as Areas of Critical Environmental Concern, such as Ellisville Harbor, have been closed to shellfishing due to pathogen contamination.

Closures continue to increase because more pathogens are finding their way into the Bays and, to a lesser extent, because improved monitoring has identified previously undocumented problems. To compound the problem, a growing body of scientific evidence suggests that, in some cases, traditional fecal indicator organisms may not be adequately portraying real pathogen risks. Pathogen contamination in shellfish areas causes economic loss, poses a significant risk to human health, and may possibly impair the natural dynamics of the marine ecosystem. Although the state's shellfishery is not in imminent danger of collapse, the time is ripe to devise a proactive shellfish management strategy to restore closed shellfish beds, ensure the sustainable management of those beds that remain open, and improve monitoring.

The interagency *Shellfish Bed Restoration Program (SBRP)* -- a coordinated partnership of the Division of Marine Fisheries, the Massachusetts Bays Program, the Natural Resources Conservation Service/MassCAP (formerly U.S. Soil Conservation Service), the County Conservation Districts, the Department of Environmental Protection, and coastal communities -- is beginning to address this need.

At the federal level, assistance also will be available from the U.S. Environmental Protection Agency. EPA will continue its ongoing efforts to assist the Massachusetts Water Pollution Abatement Trust (which administers the State Revolving Fund (SRF) in cooperation with the Massachusetts Department of Environmental Protection, which makes decisions regarding SRF expenditures), with the marketing of the SRF as a funding vehicle for nonpoint source projects (as planned under s.319, Clean Water Act) and CCMP implementation projects (as planned under s.320, Clean Water Act). EPA will assist the Trust and DEP, as necessary, in their efforts to design a streamlined loan process for local nonpoint source pollution abatement projects that will improve the quality of shellfish growing areas and other coastal waters.

[See also *Action Plan for Reducing and Preventing Storm-water Pollution.*]

DMF ACTION #2.1:

The Division of Marine Fisheries should conduct three (3) *Sanitary Survey Training Sessions* annually – one each on the North Shore, Metro Boston/South Shore, and Cape Cod – to educate local shellfish constables and health officers on the proper techniques for identifying and evaluating pathogen inputs into shellfish harvesting areas.

RATIONALE:

The consumption of raw and/or partially cooked bivalve shellfish can pose a public health risk if the shellfish are harvested from waters contaminated with bacterial pathogens associated with sewage or with other contaminants associated with industries and agriculture. The first critical control point for assuring safe shellfish for the state's commercial and recreational shellfisheries is insuring that the shellfish are harvested from waters of acceptable sanitary quality. Conducting regular sanitary surveys in accordance with the provisions of the National Shellfish Sanitation Program is the recognized method for determining acceptable shellfish water quality.

RESPONSIBLE AGENT(s):

The Division of Marine Fisheries will be responsible for this action. DMF has the statutory responsibility to classify shellfish growing waters and to determine which areas are safe for the harvesting of shellfish for direct human consumption. DMF generally accomplishes these tasks by working with local officials, most often shellfish constables and health agents, to conduct shoreline surveys to identify and evaluate all real and potential sources of pollution to shellfish waters. The shoreline survey is part of the larger sanitary survey, but is the most time consuming and labor intensive part of the sanitary survey. As such, it generally requires the combined resources of the DMF shellfish program staff and the communities.

Historically, most coastal communities have been eager to assist DMF in shoreline surveys in order to provide local knowledge on their particular shellfish growing areas and to expedite the survey work.

IMPLEMENTATION STRATEGY:

DMF will conduct one day of classroom instruction on shoreline survey techniques on the North Shore, Metro Boston/South Shore, and Cape Cod, followed by one day of field training for each participating community. The training will be limited to two employees per community - preferably

the shellfish constable and health agent (or others as designated by the mayor or selectmen). Flexibility will be exercised both in the scheduling and the formality of the sessions to accommodate the participants.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

DMF will assume all costs associated with this action; the training sessions will be offered free of charge to the participating communities.

POTENTIAL FUNDING SOURCE(s):

Not applicable.

TARGET DATE:

Annually each summer.

FURTHER INFORMATION:

For further information and assistance, contact:

DFWELE Division of Marine Fisheries
(Sandwich Office)
(508) 888-1155

DMF ACTION # 2.2:

The Division of Marine Fisheries should develop and administer a local *Shellfish Management Grants Program* to help communities finance the development and implementation of effective local shellfish management plans.

RATIONALE:

Shellfish management in Massachusetts is vested in the coastal cities and towns pursuant to M.G.L. C.130 §52. Historically, the Division of Marine Fisheries has provided reimbursements under §20A for local monies expended for shellfish management. Originally appropriated from the Tourism Fund, and later from the General Fund, an average of \$300,000 was apportioned annually on a percentage basis according to actual expenditures among the eligible communities. This reimbursement program was in place from FY1975 until 1989, but has been unfunded since that year. Now there is mounting interest in reviving this program as a *grants* program, with greater oversight by DMF. Funding could be prioritized based on peer review, and could be directed to specific shellfish propagation programs. The recipient communities could maximize the benefits of these grants by receiving them at the beginning of each fiscal year and augmenting them with local funds.

RESPONSIBLE AGENT(s):

DMF, assisted by local shellfish officers, would be responsible for this action.

IMPLEMENTATION STRATEGY:

If an appropriation for this purpose were made from the General Fund and transferred to the Marine Fisheries Fund, the Director of DMF could promulgate regulations to establish the *Shellfish Management Grants Program*. An advisory committee, comprised of DMF staff and local shellfish officers, could then be appointed by the Director and the Massachusetts Shellfish Constables' Association to help develop and implement the program. The committee could establish evaluation criteria and review and approve grant applications. DMF could administer the grants and evaluate the performance of the recipient communities.

LEGISLATION REQUIRED:

New legislation is not required if this action is undertaken as part of the state's annual budget process. Alternatively, the program could be established through separate legislation, possibly filed by members of the Cape Cod delegation.

ESTIMATED COST:

\$300,000. Previous legislation on this matter included authorization for one staff position within DMF to administer the original reimbursement program. At the present (higher) level of staffing within DMF's Shellfish Sanitation and Management Program, the proposed *Shellfish Management Grants Program* could be administered without additional staff support. A first year appropriation of \$300,000 would be sufficient to fund the local grants.

POTENTIAL FUNDING SOURCE(s):

General Fund, matched by local appropriations.

TARGET DATE:

Implementation is dependent on the budget cycle. The proposed program could be developed as soon as funding is authorized and implemented shortly thereafter.

FURTHER INFORMATION:

For further information and assistance, contact:

DFWELE Division of Marine Fisheries
(617) 727-3193

SBRP ACTION #2.3:

The interagency *Shellfish Bed Restoration Program* task force should continue and expand its innovative efforts to protect and restore shellfish beds impacted by nonpoint source pollution.

RATIONALE:

Closure of shellfish beds due to nonpoint source pollution is both a visible indicator of degraded water quality and evidence of a decline in quality of life for coastal residents. Harvesting local shellfish beds has served for generations as a source of both income and recreational pleasure. No single state, federal, regional, or local entity has the resources and mandate to identify, assess, remediate, monitor, and reopen shellfish beds. Rather, an integrated, multi-agency team approach is needed. Such an approach allows the focusing of shared resources on the common goal of reopening beds, and is an innovative solution to the shellfish pollution problem.

RESPONSIBLE AGENT(s):

In October of 1993, an interagency task force coordinated by the Massachusetts Bays Program agreed to work together on the common goal of reopening shellfish beds along the Massachusetts and Cape Cod Bays coastline. Secretary of Environmental Affairs Trudy Coxé offered her support and endorsement to this effort, called the *Shellfish Bed Restoration Program (SBRP)*. The members of the task force are the Massachusetts Bays Program, the Division of Marine Fisheries (DMF), the Natural Resources Conservation Service/MassCAP (NRCS, formerly the U.S. Soil Conservation Service), the County Conservation Districts, the Department of Environmental Protection (DEP), and representatives of impacted communities.

IMPLEMENTATION STRATEGY:

The Division of Maine Fisheries has agreed to develop a list of shellfish bed sites adversely impacted by storm drain runoff which could be opened following a program of pollution mitigation and monitoring. The Natural Resources Conservation Service/MassCAP and County Conservation Districts have agreed to assist in pollution source assessment and design of remediation strategies. The Massachusetts Bays Program has agreed to provide technical assistance to the impacted communities and to seek their participation in the pursuit of funding for mitigation. In addition, the Massa-

chusetts Bays Program has agreed to assist in developing an outreach program in the communities and to transfer technical information and lessons learned to other impacted communities. DMF has agreed to monitor the success of the remediation efforts and to reopen shellfish beds to harvesting when the water quality has improved sufficiently. Recently, the DEP joined this collaborative effort, offering its support in the areas of pollution source assessment and remediation.

Since its inception, the *Shellfish Bed Restoration Program* has identified twelve closed shellfish beds for assessment and remediation. Preliminary site assessments have been completed for each of these closed beds, and mitigation strategies have been designed for six of the sites. A full-time program manager/shellfish biologist was hired early in 1995. Over the next year, the SBRP will work with local, regional, state, and federal agencies and citizens groups to: 1) assess pollution sources and design mitigation strategies for the remaining sites; 2) implement projects for which funding has already been secured; 3) develop monitoring programs and outreach strategies to ensure that reopened beds remain harvestable; 4) promote task force participation by other state agencies with an interest in shellfish resources (e.g., the Department of Fisheries, Wildlife, and Environmental Law Enforcement's Riverways Program); and 5) coordinate with other regional initiatives focused on shellfish bed restoration - for example, in the Gulf of Maine. Finally, the SBRP will continue to identify new sites for remediation and will actively work with communities to develop proposals for funds which target nonpoint source pollution remediation.

LEGISLATION REQUIRED:

New legislation is not required at this time.

ESTIMATED COST:

Assessments and development of pollution mitigation strategies	- \$100,000
Pollution mitigation	- \$500,000
Staffing and equipment	- \$120,000

POTENTIAL FUNDING SOURCE(s):

The Massachusetts Bays Program has committed \$80,000 for site assessment, remediation strategy development, and monitoring of the initial group of twelve shellfish bed sites. Implementation of mitigation strategies is estimated to cost \$500,000. A total of \$80,000 is available for assessment and mitigation projects under the USEPA's Section 104(b)3 Program (Clean Water Act funds). Additional Clean Water Act funds (FY95, \$62,000) have been awarded from the Section 319 Program for two remediation demonstration projects, and additional s.319 funds are being sought for FY96.

Other potential funding sources include: the Seaport Bond, an EOE budget line item in support of Coastal Assessment and Enhancement, and Massachusetts Highway Department "Enhancement" funds.

TARGET DATE:

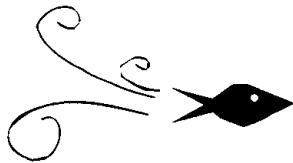
June 1996 for reopening of acreage within the initial 12 shellfish beds.

FURTHER INFORMATION:

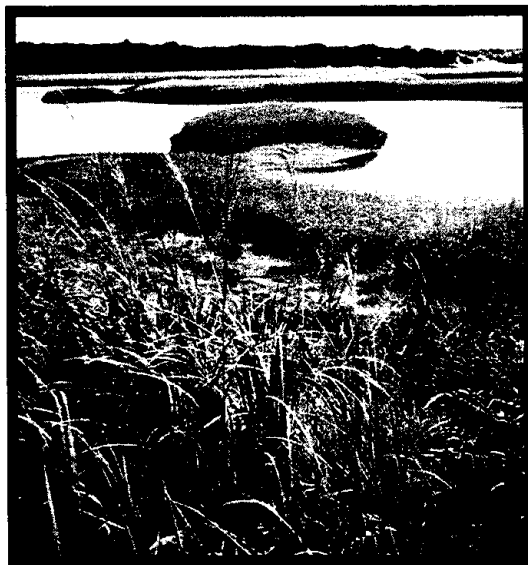
For further information and assistance, contact:

Massachusetts Bays Program
(617) 727-9530

chapter V



**Protecting and
Enhancing Coastal
Habitat**



ACTION PLAN #3

PROTECTING AND ENHANCING COASTAL HABITAT

Massachusetts and Cape Cod Bays contain a rich variety of estuarine and marine habitats. The coastal zone encompasses shallow tidal creeks, sandy beaches, rocky headlands, and deep ocean waters. The same areas that often attract human development also provide essential food, cover, migratory corridors, and breeding and nursery areas for a broad array of coastal and marine organisms, including commercially important fish and shellfish species. As development pressures mount, it is increasingly important to protect and enhance sensitive coastal habitat.

The coastal zone encompasses several distinct types of habitat, including:

Salt Marshes

Salt marshes are flat, open, grassy areas bordering tidal waters. They are typically found in or adjacent to areas protected from the high energy of the open coast, such as estuaries, salt ponds, and barrier beaches. Once considered wasteland, salt marshes were often filled to support residential development or agriculture. They are in fact extremely productive habitat, and are now recognized as a critical component of the marine ecosystem. Many economically and environmentally significant fish and shellfish species reside in salt marshes for at least part of their life cycle. Moreover, decaying salt marsh grasses are consumed by a wide variety of invertebrates, which in turn are consumed by fish, birds, and marine mammals. Salt marshes also protect the coastal zone from floods and absorb certain water-borne contaminants.

Although a large percentage of the state's salt marshes have been lost to development, there are still more than 36,000 acres of salt marsh habitat in the Massachusetts Bays region. Most of this is located on the North Shore and Cape Cod. Important pocket marshes found throughout the region include a total of 5,700 acres on the South Shore and approximately 2,000 acres in the Boston Harbor region.

Tidal Flats

Also known as clam flats, tidal flats are shallow, intertidal areas in quiet bays and estuaries. Their sand-mud substrate does not support large plants, but it does provide habitat for microscopic algae and vast numbers of clams, quahogs, and

marine worms. Some of the species found on tidal flats -- especially shellfish -- are commercially important. All play an important role in the coastal ecosystem. Tidal flats are especially important foraging areas for wading shorebirds and migratory waterfowl. Cape Cod boasts more than 15,000 acres of tidal flats. Another 17,000 acres are scattered throughout the Massachusetts Bays region.

Beds

Although eelgrass may look to the casual observer like any other marine flora, eelgrass beds actually serve several critical functions in the estuarine environment. These beds provide habitat for many species of finfish, shellfish, and waterfowl. They reduce turbidity and improve water quality by filtering suspended sediments and serving as a baffle to moving sand. They are an essential component of nearshore food webs. And they provide nursery and feeding grounds for a number of commercially and ecologically important fish species, such as winter flounder and bay scallops.

Unfortunately, eelgrass beds are threatened by many sources of pollution, including sewer and stormwater discharges, dredge and fill projects, heavy boat traffic, and nonpoint sources of pollution such as urban runoff and nearby septic systems. Although the status of Commonwealth's eelgrass beds is still largely undetermined, limited aerial surveys and on-site investigations indicate that beds are shrinking throughout the Massachusetts Bays region. Eelgrass is now reduced or absent in a number of North Shore estuaries and embayments in which it once occurred, including the Merrimack River estuary, Essex Bay, and Salem and Marblehead Harbors. Eelgrass meadows in some Cape Cod embayments have also been replaced by undesirable macroalgal communities. Further reductions in eelgrass habitat may have serious consequences for nearshore ecosystems.

Barrier Beaches

Most barrier beaches are long, narrow strips of coastal dune and beach comprised of sand and gravel. They typically begin as spits of sand which grow out from and run parallel to the shore. As nearshore currents and tides deposit or erode additional material, the barrier beach may connect to land on both ends, or it may form an island. Whatever its shape, the inland side of a barrier beach generally borders an estuary or

marsh system. The side facing the open ocean absorbs the brunt of storms and tides, and is therefore extremely unstable. Although most geological changes to the land occur too gradually to be noticeable to the human observer, erosion and deposition can dramatically alter a barrier beach in only a few years.

Ecologically, barrier beaches are extremely important. They provide critical feeding and nesting habitat for wading birds, shorebirds, and waterfowl, including rare species such as the piping plover and roseate tern. Moreover, many marine and anadromous fish use the sheltered, brackish waters behind barrier beaches as feeding or spawning areas. Human uses, too, are significant. Barrier beaches are outstanding aesthetic and recreational resources. Careful management is needed to ensure that human uses are compatible with inherently fragile and volatile barrier habitats.

Rocky Headlands and Intertidal Shores

Rocky shore ecosystems occur along numerous stretches of the Massachusetts Bays coastline. In some places, they have developed on rocky headlands such as those found in Rockport, Gloucester, and other North Shore communities. In other places they have developed on the boulders and cobbles of glacial moraines, common along the South Shore and Cape Cod. Pounded by waves, dried by sun and wind, these resilient ecosystems are often subject to great physical stress. Despite these harsh conditions, however, rocky shores support a wide array of plant and animal life, including algae, crustaceans, mollusks, and some finfish.

Nearshore Waters

The nearshore waters of Massachusetts Bays are the chief breeding ground for many commercially important marine animals, including lobster, haddock, bluefin tuna, winter flounder, and Atlantic cod. These waters are also a feeding ground for numerous marine birds and mammals such as the Atlantic white-sided dolphin, harbor porpoise, harbor seal and on occasion, the grey seal. Deeper, offshore waters attract many species of whale, including the humpback, finback, minke, and the world's last remaining Northern right whales.

Islands

Most of the islands in Massachusetts Bays are highly developed. However, there are some islands with unspoiled herbaceous, shrub and forest habitat. Because of their isolation and lack of predators, these islands attract nesting populations of migratory seabirds, including terns, gulls, egrets, and herons. Outstanding examples of undisturbed islands include Thatcher Island and Milk Island off the North Shore.

Some of the best coastal habitat in the Massachusetts Bays region is publicly owned and protected. The Thatcher Island National Wildlife Refuge, the Parker River National Wildlife Refuge, Cape Cod National Seashore, the Crane Wildlife

Refuge, and the Boston Harbor Islands State Park are examples of publicly-owned, relatively pristine coastal habitat.

Unfortunately, parts of the coasts, including wetlands, are being steadily degraded or irretrievably lost to development. Since colonial times, Massachusetts has lost approximately 20 to 30 percent of its original coastal wetlands to human development. Another 1,000 acres of coastal and inland wetlands--0.2 percent of the state's total--are lost each year. Losses result both from direct development and from the cumulative impacts of small projects.

Recognizing the importance of its wetlands, the Commonwealth has established a complex structure of laws and regulations to combat wetlands loss. The cornerstone of the state's current Wetlands Protection Program is the Wetlands Protection Act. This Act established a public review and decision-making process to preserve the state's dwindling wetlands. It is administered by local Conservation Commissions with oversight from the state Department of Environmental Protection (DEP). Under its provisions, any person who would remove, fill, dredge, or alter a wetland must file a Notice of Intent to initiate a process of public review. In wetland areas that provide habitat for rare or endangered species, no alteration which would have an adverse impact is allowed. A number of such areas have been mapped by the Natural Heritage and Endangered Species Section of the Massachusetts Division of Fish and Wildlife (DFW). The Act also sets strict performance standards for any alteration to banks, submerged land, and some floodplain areas which support wildlife.

Although Massachusetts is considered to have one of country's the most effective wetlands protection programs, the state has not been able to completely stem wetlands loss. Losses still occur from certain public and private projects (such as bridge construction and road crossings) which are exempt from the Wetlands Protection Act. Farming practices which qualify as "normal maintenance and improvement" of agricultural land also are exempt, and small dredge and fill projects may be permitted by variance under the Act. Moreover, the Wetlands Protection Program relies heavily on replicated wetlands to mitigate "unavoidable" losses. The success rate of these replication projects seems to have been less than adequate, according to some state and local conservation officials.

At the federal level, agencies such as the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (ACOE) play key roles in protecting wetlands under s404 of the Clean Water Act. It should be noted that this regulatory framework can apply to those projects which may be exempt from the State's Wetlands Protection Act. Further, under the ACOE's specific regulatory responsibilities, the "nationwide permits" have been revoked in Massachusetts and replaced with the Programmatic

General Permit (PGP). The PGP simplifies and strengthens wetlands protection, since it dovetails with federal, state, and local permitting processes and efforts.

The effectiveness of the Wetlands Protection Act is also impaired by the limitations of municipal government. At the local level, responsibility for protecting coastal wetlands falls primarily on local Conservation Commissions. Most Commission members take this responsibility seriously, and invest considerable time in attempting to properly review Notices of Intent filed in their community. Unfortunately, most Commissions lack professional staff, and their volunteer members are often ill-equipped to deal with the Act's intricacies. Although the state DEP offers voluntary training courses, many Commission members never receive formal training in the provisions of the Act and its regulations. While Commission members do learn from experience, the learning process can be quite lengthy, especially when compared with the typical rate of turnover on a Commission. Compounding this problem is the lack of accurate, up-to-date maps, scaled for local use, showing the location of coastal habitats which warrant special protection. Existing maps are spread throughout a variety of local, state, and federal agency files, and vary considerably with respect to scale, format, and reproducibility. Accordingly, they are either unavailable to Commission members or are of limited value to local decision-makers.

The Wetland Protection Program's efforts to prevent wetland *degradation* are lagging even further behind its efforts to prevent wetland loss. The quality of coastal habitat is intimately related to the quality of incoming water and

sediment. Unfortunately, the state's existing management framework does not adequately address the point and nonpoint pollution sources which affect coastal wetlands. Nor does it address the hydrographic modifications associated with small development projects, such as changes in the amount of freshwater flowing into a wetland area or the rate of sediment deposition. When evaluating the overall threat to coastal habitat, these cumulative or secondary impacts must be considered as seriously as direct development.

The Commonwealth has launched some creative initiatives to remedy the shortcomings of the Wetlands Protection Program and to help the state meet its short-term goal of "no net loss" of wetlands. The Wetland Conservancy Program uses aerial photographs to map wetland areas and inform public officials and land owners of activities which are incompatible with the goals of the Wetlands Protection Program. More recently, the Massachusetts Executive Office of Environmental Affairs (EOEA) initiated a Wetlands Restoration and Banking Program. This program will coordinate the restoration of degraded wetlands throughout the state, and will study the concept of wetlands "banks" as a means of improving the success of wetlands mitigation.

The complexity of the state's wetlands regulations provides one indication of its commitment to protect and preserve its coastal habitat. Local officials and private landowners must show the same commitment if the coastal habitat of Massachusetts Bays is to be maintained. The following recommendations suggest ways in which all parties can work cooperatively towards the common goal of preserving our coastal heritage.

MUNICIPAL ACTION # 3.1:

Municipalities should prepare and implement an EOEA - approved *Open Space Plan* to preserve and protect key wetlands, floodplains, fish and wildlife habitat, and other ecologically- and recreationally-important natural resource areas.

RATIONALE:

The appearance of a community, the lifestyle of its residents, and the richness of its natural resources can be dramatically altered in a short period of time if steps are not taken to preserve open space. During the building boom of the '80s, numerous Massachusetts communities saw their populations increase radically, straining their infrastructure and financial resources, and destroying or degrading irreplaceable land and water resources. In many instances, loss or fragmentation of open land resulted in noticeable declines in water quality and wildlife habitat.

Completing an *Open Space Plan* gives the community a powerful tool to begin directing development away from sensitive natural resources and, in some cases, to achieving lasting economic benefits. Protecting aquifers and watershed lands, for example, can avert prolonged and costly drinking water contamination incidents in a community. Protected open space also increases the taxable value of adjacent properties and, in the long run, can impose less strain on a municipal budget than the infrastructure and services required by development.

Completing an *Open Space Plan* can also start a growth management process that will lead to the development of strategies to maintain ecosystem integrity. Although not properly part of an official *Open Space Plan*, the thought process in developing those strategies can lead to: 1) adoption of stricter zoning bylaws and other development controls that regulate percent imperviousness in a watershed; 2) establishment of strong sediment and erosion control bylaws; and 3) adoption of design or performance standards for stormwater runoff best management practices (BMPs).

Completing a local *Open Space Plan* also positions the community to take an important next step - establishing a more expansive greenway network for the surrounding region. Linking gems of open space in neighboring communities preserves regionally-significant scenic vistas and wildlife corridors, and provides recreational opportunities not available at the local level alone. Within the coastal zone, this concept has been extended to include the linkage of sites in more developed waterfront areas. It has taken hold in several communities where continuous public access to and along the shoreline of developed harbors has been pursued with technical and financial assistance from

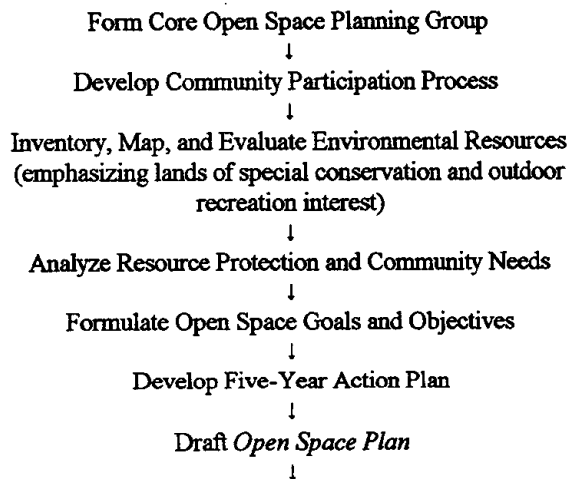
CZM's Harbor Planning Program.

RESPONSIBLE AGENT(s):

Conservation Commissions and Planning Boards would generally be responsible for this action, with input and assistance from Recreation Committees, local land trusts, watershed associations, and outdoor user groups (hikers, hunters and fishermen, cross-country skiers, etc.).

IMPLEMENTATION STRATEGY:

The Open Space Planning process should be an open, interactive process that invites the participation and input of diverse sectors of the community. The Executive Office of Environmental Affairs (EOEA) Division of Conservation Services has developed a step-by-step handbook (*The Open Space Planner's Workbook, 1990*) to help guide communities through this process, and local planners should closely follow these guidelines in developing their *Open Space Plans*. Consistency of the local plans with the EOEA guidelines is a prerequisite for state approval of the plans. State approval helps to establish a community's eligibility for Self-Help and other grant program funds to purchase and protect key open space parcels. While particular open space and development-related issues may vary from one community to another, municipalities should generally adhere to the planning process prescribed by EOEA, as follows:



Solicit Public Comment

↓

Complete and Submit Plan for EOE A Approval

↓

Implement the *Open Space Plan* (ongoing)

In setting priorities for land acquisition (or preservation via conservation restrictions), coastal communities should give special consideration to developable upland areas which: 1) adjoin, or drain to, prime shellfish harvesting areas; 2) are located within flood hazard zones or will be subject to relative sea level rise; and 3) border vegetated wetlands. The latter areas should be kept as free as possible from development as these will be needed for wetlands to retreat to under rising sea level conditions.

LEGISLATION REQUIRED:

Preparation of an *Open Space Plan* will not require new legislation. However, *implementation* of the plan may require some legislative changes locally, including amendments to the zoning bylaw and new or revised land use policies and regulations.

ESTIMATED COST:

The cost of preparing an *Open Space Plan* can vary widely, depending on a community's staff resources and reliance on paid consultants. Many, if not most, successful plans have been developed at relatively low cost by teams of local volunteers supported by Regional Planning Agencies and other outside groups. EOE A strongly recommends this approach, and numerous environmental agencies and organizations (EOEA, Regional Planning Agencies, U.S. Fish and Wildlife Service (USFWS), watershed associations, land trusts) are willing and able to offer valuable information and assistance. (For example, various EOE A agencies and USFWS can assist municipalities in the identification of important coastal habitats, as well as opportunities for state and federal grants to protect and enhance these habitats. They recently contributed fish and wildlife habitats information to the *Massachusetts Bays Community Resource Atlas*, an MBP-funded document that will be distributed among the 49 coastal communities in the near future.) The local cost of a plan prepared largely by volunteers, including mapping and production costs, is often less than \$5,000.

POTENTIAL FUNDING SOURCE(s):

In most cases, local revenues must be used for development of the plan. However, for *implementation* of the plan, specifically land acquisition and preservation, the Division of Conservation Services offers several grant programs, including the Self-Help and Urban Self-Help Programs (52% - 70% state funding), and the Federal Land and Water Conservation Funds (50% federal/50% local). Another federal grant program, the Urban Park and Recreation Recovery Program (UPARR), can provide matching grants and technical assistance to selected, economically distressed urban communities.

In addition, DEM, DFWLE, and various nonprofit land trusts can commit funds to purchase and protect lands of special ecological significance.

TARGET DATE:

1996 and as local resources permit. A local *Open Space Plan* is an integral part of a community's overall planning program and may require 1-2 years to complete. (*Implementation* of the plan is, of course, an ongoing process.) Accordingly, communities should begin the open space planning process as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

EOEA Division of Conservation Services
(617) 727-1552
Your area's Regional Planning Agency
Your County Conservation District
U.S. Fish and Wildlife Service
(Gulf of Maine Project)
(207) 781-8364

MUNICIPAL ACTION #3.2:

Municipalities should adopt and implement a local *Riverfront District Bylaw* to maintain river water quality, preserve fish and wildlife habitat, and protect downstream nursery and shellfish resources.

RATIONALE:

The Massachusetts River Protection Act (MRPA) bill currently before the Legislature seeks to establish river corridor protection on a uniform statewide basis. The bill calls for the creation of a 25-150 foot riverfront setback for development along many rivers and streams in the Commonwealth. So why adopt a *local* bylaw if the state passes the Massachusetts River Protection Act? There are several compelling reasons:

- 1) Many tributaries are not covered by the MRPA and warrant further protection from inappropriate development.
- 2) Local bylaws can be written specifically for the needs of local rivers and the community.
- 3) Local bylaws can require a *vegetated* buffer strip (not required by the MRPA) within a Riverfront District to attenuate nonpoint source pollution and provide wildlife habitat.
- 4) A community will be more likely to enforce a local bylaw that it has helped craft and that its citizens support.

In addition, the provisions of the local bylaw may serve as a "Municipal Development and Protection Plan" under the proposed MRPA with approval from the Secretary of the Executive Office of Environmental Affairs. This means that, with approval, the provisions of the local bylaw would also serve as the provisions governing the application of the MRPA within the community. Local *Riverfront District Bylaws* will complement and supplement the MRPA just as local wetlands bylaws complement and give added local protection to the Wetlands Protection Act.

RESPONSIBLE AGENT(s):

Planning Boards and Conservation Commissions would generally be responsible for this action, with input and assistance from other local boards (Selectmen, Board of Health), Adopt-A-Stream groups, local land trusts, sportsmen clubs, and abutting property owners.

IMPLEMENTATION STRATEGY:

The River District planning process should be an open, interactive process that invites the participation and input of diverse sectors of the community. One practical way for a community to proceed with a *River District Bylaw* is for the Planning Board to appoint a subcommittee to: (1) study the community's rivers and evaluate options for protection, and (2) if feasible, draft an amendment to the zoning bylaw and help shepherd it through Town Meeting. Because state law requires that the Planning Board issue a report with recommendations on all proposed zoning changes to Town Meeting, the Planning Board can play a key role in the process. By involving Planning Board members early in the initiative, they can share their knowledge, "buy" into and promote the initiative, and provide political standing. In return, the subcommittee will be helping an already busy town board by doing much of the background work required to establish local river protection.

The Riverways Program within the Department of Fisheries, Wildlife & Environmental Enforcement (DFWELE) has published a step-by-step handbook (*Riverways Community Guide-Strategies for Drafting and Passing Local River Protection Bylaws*) to help guide communities through this process, and this should be consulted to get the process underway.

LEGISLATION REQUIRED:

This action involves adoption of a local *Riverfront District Bylaw* as an amendment to the community's existing zoning bylaw, and requires town meeting or city council approval, depending on the community's governmental structure.

ESTIMATED COST:

The cost of developing and adopting a *Riverfront District Bylaw* should be minimal. Model river protection bylaws are available that can be adopted either in their present form or with minor modifications to reflect individual community needs. Technical assistance in drafting a river protection bylaw is available from the DFWELE Riverways Program and the Regional Planning Agencies.

POTENTIAL FUNDING SOURCES:

Local revenues

TARGET DATE:

1996 and as local resources permit. This is a high priority action from a water quality standpoint and should be implemented by municipalities as soon as possible to prevent further loss and degradation of important river corridors.

FURTHER INFORMATION:

For further information and assistance contact:

DFWELE Riverways Program
(617) 727-1614
Your area's Regional Planning Agency

MUNICIPAL ACTION #3.3:

Municipalities with Areas of Critical Environmental Concern (ACEC) should work cooperatively with neighboring communities, EOEA agencies, and other interested parties to develop proactive, long-term *ACEC Management Plans* to preserve and protect these vital resource areas.

RATIONALE:

An ACEC is an area containing concentrations of highly significant environmental resources that has been formally designated by the Commonwealth's Secretary of Environmental Affairs following a public nomination and review process.

The enabling legislation and the regulations for ACECs list several kinds of environmental features that critical areas may include, ranging from wetlands and water supply areas to rare species habitat and prime agricultural land. To be eligible for designation, an area must contain at least four of these resource features, and the resources and area must be of at least regional or statewide significance.

The objective of ACEC designation - *i.e., the long-term preservation, management, and use - or stewardship - of critical resource areas* - is a shared responsibility that can only be met through the collaborative efforts of many parties

- governmental, civic and environmental, business, and private citizens. At the *state* level, ACEC responsibilities and actions are well established. Among other things, state regulations require that all EOEA agencies subject certain projects of federal, state, and local agencies and private parties to the "closest scrutiny" to assure that strict environmental standards are met for any action "subject to their jurisdiction." While this directive covers a number of important activities, many others remain the province of *local* government. In fact, effective stewardship of ACEC's must be largely community-based.

To date, few communities have purposefully integrated the stewardship of ACECs into their land use policies, plans, and regulations. As a result, many zoning bylaws, building codes, health regulations, and the like may be at variance with critical resource area protection, and may need to be strengthened to assure the long-term viability of the ACECs.

Statewide, there are 25 coastal and inland ACECs comprising approximately 170,000 acres:

	Approx. Acres	Communities
<u>Coastal ACECs</u>		
Bourne Back River	1,850	Bourne
*Ellisville Harbor	600	Plymouth
*Herring River Watershed	4,450	Bourne, Plymouth
*Inner Cape Cod Bay	2,550	Brewster, Eastham, Orleans
*Neponset River Estuary	1,260	Boston, Milton, Quincy
*Parker River/Essex Bay	25,500	Essex, Gloucester, Ipswich, Newbury, Rowley
Pleasant Bay	9,050	Brewster, Chatham, Harwich, Orleans
Pocasset River	150	Bourne
*Rumney Marshes	2,800	Boston, Lynn, Revere, Saugus, Winthrop
*Sandy Neck/Barnstable Harbor	8,850	Barnstable, Sandwich
Waquoit Bay	2,550	Falmouth, Mashpee
*Weir River	950	Cohasset, Hingham, Hull
*Wellfleet Harbor	12,350	Eastham, Truro, Wellfleet
*Weymouth Back River	950	Hingham, Weymouth
<u>Inland ACECs</u>		
Canoe River Aquifer	17,200	Easton, Foxborough, Mansfield, Norton, Sharon, Taunton
*Central Nashua River Valley	12,900	Bolton, Harvard, Lancaster, Leominster
*Cranberry Brook Watershed	1,050	Braintree, Holbrook
*Fowl Meadow/Ponkapoag Bog	8,350	Boston, Canton, Dedham, Milton, Norwood, Randolph, Sharon, Westwood
*Golden Hills	500	Melrose, Saugus, Wakefield
Hinsdale Flats Watershed	14,500	Dalton, Hinsdale, Peru, Washington
Hockomock Swamp	16,950	Bridgewater, Easton, Norton, Raynham, Taunton, West Bridgewater
Kampoosa Bog Drainage Basin	1,350	Lee, Stockbridge
Karner Brook Watershed	7,000	Egremont, Mount Washington
Schenob Brook Drainage Basin	13,750	Mount Washington, Shellfield
*Westborough Cedar Swamp	1,800	Hopkinton, Westborough

* Denotes location within Massachusetts Bays watershed

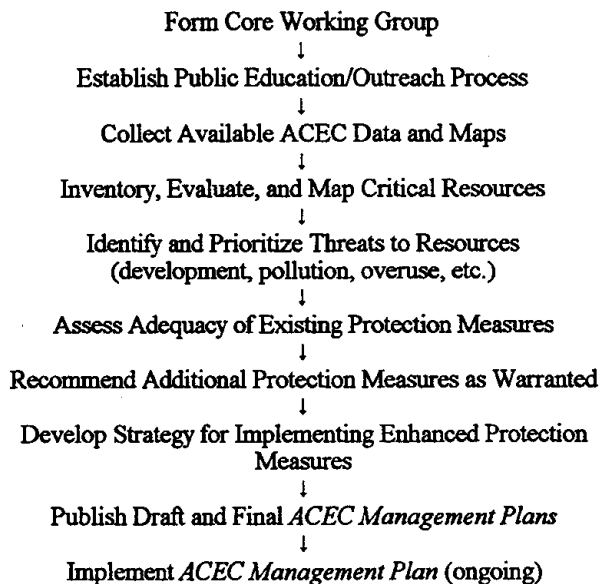
RESPONSIBLE AGENT(s):

Planning Boards, Boards of Health, Conservation Commissions, and the nominators of ACEC designations would share much of the responsibility for this action, but should solicit the advice and assistance of other local authorities -- Selectmen, Boards of Appeal, DPWs -- which also play a role in effecting local land use policies and practices. Municipalities may be interested in establishing a local or regional ACEC task force or working group.

IMPLEMENTATION STRATEGY:

Development of a local *ACEC Management Plan* should be an open, interactive process that invites the participation of diverse sectors of the community. In addition to the above boards, the process should involve representatives of local land trusts and watershed associations, affected property owners and businesses, Regional Planning Agencies, and state environmental agencies - most notably DEM and CZM. The latter two agencies share much of the responsibility for monitoring and protecting ACECs at the state level, and can offer trained staff to advise and assist communities on ACEC-related matters. CZM has developed guidelines to help communities prepare coastal resource management plans for ACECs pursuant to the Chapter 91 (Waterways) Regulations (see *Final Guidance Document - The Development of Resource Management Plans for Coastal Areas of Critical Environmental Concern*, 1992), and these are an excellent starting point. Further guidance materials may be forthcoming from the DEM ACEC Program over the next several years.

In developing a local *ACEC Management Plan*, communities should generally adhere to the following process:



Critical to the ultimate success of this effort will be the public's awareness of, and appreciation for, the ACEC - so public outreach and education should be a key component of the planning and implementation process.

LEGISLATION REQUIRED:

Preparation of a local *ACEC Management Plan* will not require new legislation. However, *implementation* of the plan may require some legislative changes locally, including amendments to the zoning bylaw and building code, and new or revised land and water use policies and regulations.

ESTIMATED COST:

The cost of preparing a local *ACEC Management Plan* will depend on the plan's level of detail and the community's reliance on paid consultants. If the bulk of the work is performed by local staff and volunteers, as is recommended, costs should be modest (\$2,500 - 5,000). A broad range of technical assistance - including inventorying, mapping, and evaluation of natural resources, and drafting of protection strategies - is available from DEM, CZM, and the Regional Planning Agencies.

POTENTIAL FUNDING SOURCE(s):

Local revenues; Executive Office of Communities and Development (EOCD) strategic planning grants.

TARGET DATE:

1999 and as local resources permit. A local *ACEC Management Plan* will be an integral part of the community's overall planning program and may require several years or more to complete. (*Implementation* of the plan is, of course, an ongoing process.) Accordingly, communities are encouraged to begin the ACEC management planning process as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

DEM's ACEC Program (617) 727-3160
Coastal Zone Management Office
(617) 727-9530

Your area's Regional Planning Agency
NRCS Community Assistance Unit
(508) 295-1481

MUNICIPAL ACTION #3.4:

Municipalities should adopt and implement a local *Wetlands Protection Bylaw* to supplement the state Wetlands Protection Act and Regulations.

RATIONALE:

While the Massachusetts Wetlands Protection Act (WPA) and its Regulations are considered among the most protective wetlands legislation in the country, they have several deficiencies which stricter *local* bylaws can address. As examples, the Cape Cod Commission's Regional Policy Plan cites the following:

- The Wetlands Protection Act does not provide any protection for buffer areas surrounding wetlands that provide important functions, including mitigating stormwater impacts, removing nutrients, and recharging ground water. Research has documented the increase in nitrogen and phosphorus loading to wetlands as adjacent watershed areas are cleared of vegetation. Buffer areas are also often exceptionally valuable wildlife habitat. Many bird species such as herons nest in upland trees adjacent to wetlands, but feed in the wetlands. Without buffer area protection, these nesting areas could be destroyed. Recent studies suggest that buffers 100 to 300 feet wide are needed to protect surface water bodies from sedimentation and maintain wildlife habitat, and 300 to 1000-foot buffers are needed for 50 to 90 percent nutrient removal. A 200 foot buffer is recommended to protect the scenic value of a natural area.
- Many of the Cape's wetlands occur as isolated kettle holes that do not meet the size thresholds for protection in the state Act.
- Many developments have been designed to discharge stormwater directly to waterbodies or to use natural wetlands for stormwater management and attenuation of pollutants, a practice that may result in degradation of the wetland and could adversely affect downstream waters.

Local wetlands bylaws can compensate for these deficiencies by expanding the definition of wetlands resources, requiring building and septic system setbacks to protect buffer zones and improve water quality, and prohibiting or limiting wetlands replication (conversion of upland to man-made wetland). In addition, they can address the special needs of non-permanent wetland types, such as vernal pools and seasonally variable ponds (e.g., Mary Dunn Pond in Hyannis). They also can provide for enhanced enforcement authority and the hiring of expert consultants to review development proposals at the applicant's expense.

RESPONSIBLE AGENT(s):

Conservation Commissions and their agents would have primary responsibility for this action, with assistance from the Board of Health, Planning Board, and Building Inspector.

IMPLEMENTATION STRATEGY:

Conservation Commissions should: 1) obtain and review model local wetlands bylaws prepared by the Regional Planning Agencies and Massachusetts Association of Conservation Commissions; and 2) adapt these bylaws, as appropriate, to respond to local needs. Such bylaws typically contain minimum performance standards to address some of the WPA deficiencies cited above. Examples include the following:

- *Natural, undisturbed buffer areas of at least 100' width shall be maintained from the edge of coastal and inland wetlands, including isolated wetlands, to protect their natural functions, including but not limited to mitigation of stormwater impacts and their wildlife habitat value. This policy shall not be construed to preclude pedestrian access paths, vista pruning, or construction and maintenance of water-dependent structures within the buffer area, any of which may be permitted at the discretion of permitting authorities where there is no feasible alternative to their location. The Conservation Commission shall require a larger buffer area where necessary to protect sensitive areas or where site conditions such as slopes or soils suggest that a larger buffer area is necessary to prevent any adverse impact to wetlands and associated wildlife habitat. Where a buffer area is already developed, this requirement may be modified by the permitting authority, provided it makes a finding that the proposed alteration will not increase adverse impacts on that specific portion of the buffer area or associated wetland.*
- *Disturbance of wetlands and buffer areas for operation and maintenance of underground and overhead utility lines (electrical, communication, sewer, water, and gas lines) may occur. Installation of new utility lines through these areas may occur where the permitting authority finds that the proposed route is the best environmental alternative for locating such facilities. In all instances, disturbance of wetland and buffer areas shall be minimized and surface vegetation, topography, and water flow shall be restored substantially to the original condition.*

- *Stormwater management plans for new development shall preclude direct discharge of untreated stormwater into natural wetlands and waterbodies.*

[Note: the state's new Stormwater Initiative and the guidance document *Urban BMPs for Massachusetts* will place additional emphasis on the creation of "artificial" wetlands for stormwater treatment in Massachusetts. Federal guidance to the states is encouraging the development and use of manmade wetlands that will retain and assimilate some pollutants before they enter coastal waterbodies. In order to ensure that these engineered systems operate effectively and in full compliance with state regulations, CZM and DEP are working collaboratively to develop policies and general guidance for artificial wetlands construction. This guidance will be available to local Conservation Commissions and Planning Boards, site designers and landscape contractors, and others interested in minimizing the water quality impacts of urban runoff.]

LEGISLATION REQUIRED:

This action requires the adoption of a local *Wetlands Protection Bylaw*, usually as a general (non-zoning) bylaw, by vote of town meeting or city council, depending on the community's governmental structure. The Conservation Commission would be responsible for administering the bylaw.

ESTIMATED COST:

The cost of developing a local *Wetlands Protection Bylaw* should be minimal. Model wetlands bylaws are available that can be adopted either in their present form or with minor modifications to reflect individual community needs. Technical assistance in drafting the bylaws is available from the Regional Planning Agencies.

POTENTIAL FUNDING SOURCE(s):

Local revenues.

TARGET DATE:

1996-1997.

FURTHER INFORMATION:

For further information and assistance, contact:

Massachusetts Association of Conservation Commissions
(617) 489-3930

Your area's Regional Planning Agency

MUNICIPAL ACTION #3.5:

Municipalities with locally-owned barrier beaches should prepare and implement ecosystem-based *Barrier Beach Management Plans* to promote responsible use and protection of these critical coastal resources.

RATIONALE:

Barrier beaches comprise approximately 222 miles (or about 21%) of Massachusetts' 1,500-mile beach shoreline. These 681 barrier beaches provide a wealth of ecological and economic benefits to the commonwealth's citizens, including:

- Outstanding fish and wildlife habitat;
- Diverse recreation and tourism opportunities; and
- Effective protection against storm and erosion damage.

Inappropriate development on barrier beaches can destroy or degrade irreplaceable natural resources and pose significant hazards to public health and safety. It also can cost the taxpayer enormous sums of money in the form of subsidized loans, disaster assistance, and infrastructure improvements. According to State-Federal Hazard Mitigation Team reports, "Hurricane Bob" (August, 1991), the "Halloween Northeaster" (October 1991), and the "December '92 Northeaster" cost Massachusetts taxpayers over \$50 million (over and above monies paid from the Federal Flood Insurance Program) to repair public roads, seawalls, sewer and water lines, buildings, and other public facilities. The 1991/1992 storm season also caused billions of dollars in damages to private property -- much of this on barrier beaches. Approximately two-thirds of all homes destroyed by these storms were located on barrier beaches. Many of the homes were behind seawalls and other erosion control structures that gave homeowners a false sense of security. Those same seawalls also contributed to beach erosion, thereby reducing the natural storm defenses of the barrier beach. Most of these seawalls have been reconstructed, sometimes at great public expense. (The large seawall and stone mound structure on Minot Beach in Scituate, for example, has been reconstructed nineteen times, and its reconstruction after the "Blizzard of '78" cost taxpayers over \$700,000.)

Effective management of barrier beaches requires the coordinated involvement of all levels of government. At the state level, Executive Order Number 181 (1980) established a framework for the state management of barrier beaches. This order directs that state acquisition of barrier beaches be made a priority. It also assigns the highest priority for use of disaster assistance funds to relocate willing sellers away from storm damaged barrier beach areas. In addition, both state and federal monies for construction projects cannot be used

to encourage new growth and development on barrier beaches. These economic policies recognize barrier beaches as hazard-prone areas where future storm damage will inevitably occur.

Local governments also play a key role in barrier beach management. Since municipal commissions, committees, and boards routinely review proposals for construction activities on barrier beaches, a large responsibility resides with local officials to ensure that proposed activities reflect both the natural and economic hazards and the environmental sensitivity characteristic of barrier beaches. The Massachusetts Barrier Beach Task Force strongly encourages municipalities to develop management plans for locally-owned barrier beach areas to promote their appropriate use and protection.

RESPONSIBLE AGENT(s):

Planning Boards and Conservation Commissions would generally be responsible for this action, with input and assistance from other local authorities -- Selectmen, Boards of Health, Boards of Appeal, Harbor and Recreation Committees -- that also play a role in effecting land use policies and practices in locally-owned barrier beaches areas.

IMPLEMENTATION STRATEGY:

Development of a local *Barrier Beach Management Plan* should be an open, interactive process that invites the participation of diverse sectors of the community. In addition to the above boards, the process should involve representatives of beach user groups, affected property owners and businesses, Regional Planning Agencies, and state environmental agencies - most notably CZM, DEP, and DEM. The latter agencies share much of the responsibility for monitoring and protecting barrier beaches at the state level, and offer trained staff to advise and assist communities on barrier beach-related matters. To assist in this effort, the Massachusetts Barrier Beach Task Force has published working guidelines (see *Guidelines for Barrier Beach Management in Massachusetts*, February 1994) that are directed to those with stewardship responsibility for the 681 barrier beaches in the Commonwealth. These guidelines prescribe a series of recommended performance standards

and management measures ("best management practices") for a broad range of land and water use activities on and around barrier beaches. Such activities include:

- Construction of buildings and facilities;
- Pedestrian uses (hiking, hunting, fishing and shellfishing, etc.);
- Watercraft and off-road vehicle use;
- Erosion control and beach restoration;
- Beach cleaning;
- Nuisance control (mosquitos, greenhead flies, exotic plants); and
- Wildlife conservation and management.

In developing a local *Barrier Beach Management Plan*, communities should carefully consult the above referenced guidelines and contact CZM for assistance. CZM has readily available maps which identify and delineate each barrier beach in the Commonwealth (see *Coastal Zone Management Barrier Beach Inventory Project*, December 1982).

In the instances where barrier beaches cross political or jurisdictional boundaries, a regional approach should be followed in drafting *Barrier Beach Management Plans*.

LEGISLATION REQUIRED:

Preparation of a local *Barrier Beach Management Plan* will not require new legislation. However, *implementation* of the plan will likely require some legislative changes locally, including amendments to the building code and new or revised land and water use policies and regulations.

ESTIMATED COST:

The cost of preparing a local *Barrier Beach Management Plan* can vary, depending on the plan's level of detail and the community's reliance on paid consultants. If the bulk of the work is performed by local volunteers, as is recommended, costs should be modest (\$2,500-5,000). A broad range of technical assistance is available from CZM, DEP, DEM, and the Regional Planning Agencies.

POTENTIAL FUNDING SOURCE(s):

Local revenues, including the general fund, a dedicated enterprise fund, beach parking and user permit fees, and non-criminal ticket fees (for violations of beach bylaws or regulations).

TARGET DATE:

1999. A local *Barrier Beach Management Plan* should be an integral part of the community's overall planning program and may require several years or more to complete. (*Implementation* of the plan is, of course, an ongoing process). Accordingly, communities should begin the Barrier Beach Management Planning process as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

Coastal Zone Management Office
(617) 727-9530

DEM Division of Forests & Parks
(617) 727-3180

DEP Division of Wetlands & Waterways
(617) 292-5695

Your area's Regional Planning Agency

MUNICIPAL ACTION #3.6:

Municipalities should employ full-time, professionally-trained conservation staff to provide ongoing technical and administrative support to the local Conservation Commissions.

RATIONALE:

Among their many other responsibilities, including open space planning and protection, local Conservation Commissions represent the first line of defense in implementing the Wetlands Protection Act (WPA). The WPA and its associated regulations are lengthy and complex, and cover a number of areas in which technical interpretations and professional judgement are required. Under the WPA, Commission authority extends to the review of projects on land under the ocean, land under salt ponds, fish runs, and land containing shellfish. Properly exercised, this authority can be used to protect valuable marine habitats -- such as DMF-designated shellfish growing areas, town-designated resources areas, Areas of Critical Environmental Concern (ACECs), fish runs, and eelgrass beds -- by prohibiting or limiting the number of new docks, piers, and their associated dredging activities or by mitigating the impacts of approved projects.

Unfortunately, not all Conservation Commissions are equipped to fully exercise this authority. The formal training of Commission members is not compulsory and the turnover rate of Commissioners is often high, so few members have developed the technical skills or comprehensive understanding of the regulations necessary to ensure their effective administration. The ongoing review of subdivision and site plans, the identification and mapping of wetlands boundaries, the development of performance standards, and the writing and enforcement of Orders of Conditions all require technical capabilities and an investment of time that are generally not available through an all-volunteer board or part-time conservation agent. Accordingly, Conservation Commissions should hire full-time professionally-trained staff (for example, an environmental engineer or wetlands scientist) who can devote full attention to carrying out the Commissions' multiple resource protection responsibilities.

RESPONSIBLE AGENT(s):

The Conservation Commission, supported by other municipal boards, would have primary responsibility for this action.

IMPLEMENTATION STRATEGY:

The Conservation Commission, in consultation with the community's finance board and chief governing body, would request approval of an expanded annual operating budget to accommodate the new staff position(s). Approval will be by either town meeting or city council vote, depending on the local government structure.

The Massachusetts Association of Conservation Commissions and the Massachusetts Municipal Association can offer guidance in developing job descriptions and advertising the new position(s) to attract qualified candidates.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost associated with hiring a full-time conservation administrator/agent is \$35,000 - \$40,000 per year, including benefits, overhead, professional membership fees, travel, and other expenses.

POTENTIAL FUNDING SOURCE(s):

Local revenues and filing fees from wetlands applications.

TARGET DATE:

1996/1997.

FURTHER INFORMATION

For further information and assistance, contact:

Massachusetts Association of Conservation Commissions
(617) 489-3930
Massachusetts Municipal Association
(617) 426-7272

DEM ACTION #3.7:

The Department of Environmental Management should develop and implement *Resource Management Plans* for all DEM-owned coastal properties.

RATIONALE:

DEM is one of the largest landowners of coastal property in Massachusetts, with coastal frontage totaling more than 32 miles. Many of these properties include fragile barrier beaches, salt marshes, and other sensitive land and water resources. Together they provide outstanding habitat for a wide variety of plant and animal species, including a number of rare and endangered species. Most of these resource areas are also highly desirable recreation sites, attracting thousands of visitors each year to fish, swim, and stroll along the water's edge. The Massachusetts Office of Travel and Tourism reports that coastal areas are the fastest growing tourist areas in the state, growing at a rate of 13% per year. The varied, and sometimes conflicting, demands that are placed on these areas require that DEM and other coastal landowners develop *Resource Management Plans* that will promote a proper balance between recreational use and the long-term protection of natural resources for future generations.

RESPONSIBLE AGENT(s):

DEM's Division of Forests and Parks and Division of Resource Conservation will share responsibility for this action.

IMPLEMENTATION STRATEGY:

The DEM staff is currently working to develop a barrier beach management plan that will address general management issues for DEM's beach properties. This general plan will be followed by specific management guidelines and plans for each of DEM's barrier beaches and other coastal properties.

Within the Massachusetts Bays region, property-specific management plans will be prepared for the following DEM coastal properties:

DEM Owned and/or Operated Coastal Properties

Salisbury Beach State Reservation - Salisbury
Plum Island (North End) - Newburyport
Sandy Point State Reservation - Ipswich
Halibut Point State Park - Rockport

Boston Harbor Islands State Park - Boston

- Gallops Island
- Great Brewster Island
- Bumpkin Island
- Grape Island

Webb Memorial State Park - Weymouth
Ellisville Harbor State Park - Plymouth
Scusset Beach State Reservation - Sandwich
Nickerson State Forest Park - Brewster
Cape Cod Bay Property

The plans are expected to follow a standard format consisting of the following:

- plan cover with photo of subject property;
- table of contents and introduction, including appropriate citations - e.g., Barrier Beach Executive Order, Wetlands Protection Act (Coastal Preamble), applicable DEM regulations;
- regional locus map and property map (topographic, GIS, or hand drawn by staff);
- property description - location, size, access, key physical and ecological attributes, public use, staffing;
- vehicular use;
- management guidelines and specifications (e.g., NHESP nationally accepted guidelines for managing plovers and terns, specifications for modular boardwalks, etc.);
- copies of information signs installed seasonally at access areas; and
- other attachments as needed, such as DEM's off-road vehicle (ORV) regulations.

In preparing the plans, DEM will consult with and seek approval (as warranted) from local Conservation Commissions, CZM and DEP regional offices, DFWLE's Natural Heritage and Endangered Species Program, and others as appropriate.

LEGISLATION REQUIRED:

New legislation is not required.

TARGET DATE:

1996/1997

ESTIMATED COST:

The cost of developing the DEM-owned coastal property management plans is expected to be borne by DEM using existing DEM planning and field staff.

FURTHER INFORMATION:

For further information and assistance, contact:

DEM Office of Natural Resources
(617) 727-3160

POTENTIAL FUNDING SOURCE(s):

Proposed Open Space Bond.

DEM ACTION #3.8:

The Department of Environmental Management should develop and promote the use of *river basin planning reports* to facilitate responsible water resources planning and management at the local and regional levels.

RATIONALE:

River basin planning reports are intended to provide a technical reference point for responsible water resources planning, management, and decision-making at the local and watershed levels. They provide the basic data and analyses needed to: 1) identify potential water resource management problems; 2) resolve outstanding issues of resource use and protection; and 3) develop and implement recommendations for community and regional water supplies and demand management activities.

RESPONSIBLE AGENT(s):

The Massachusetts Water Resources Commission, with management, planning, and engineering assistance from DEM's Office of Water Resources, will be responsible for this action. Input will be sought from the DEP Offices of Water Supply and Watershed Management, the Department of Fisheries, Wildlife, and Environmental Law Enforcement, municipal water managers, local and regional planners, citizen groups, and other agencies and individuals as appropriate.

IMPLEMENTATION STRATEGY:

DEM's Office of Water Resources will prepare sections of the EOEAs river basin reports dealing with basin and subbasin characteristics, including surface water and ground water hydrology, water supply sources and yields, current and projected community population, water use, and water conservation status. The plans will be developed on the schedule approved by EOEAs (see chart) and updated every five years.

In addition, the Office of Water Resources will prepare water resources reports to inventory and assess other aspects of basin water resources and will work with communities, other state agencies, and local groups to develop specific action plans. For example, options can be developed for a community seeking to construct a new public water supply well in an ecologically-sensitive area and may need guidance on alternative approaches. DEM reports will be distributed among governmental, regional planning, and environmental advocacy groups to promote broad awareness of water issues

and the watershed approach, and to facilitate responsible water resources planning and management at both the local and regional (i.e., watershed) levels.

EOEA BASIN SCHEDULE
(Massachusetts Bays River Basins)

<u>Basin</u>	<u>Assessment</u>	<u>Planning</u>	<u>Implementation</u>
Nashua	1993	1994	1995
Merrimack	1994	1995	1996
Boston Harbor	1994	1995	1996
Cape Cod	1994	1995	1996
Parker	1994	1995	1996
Ipswich	1995	1996	1997
Shawsheen	1995	1996	1997
Concord	1996	1997	1998
South Coastal	1996	1997	1998
Charles	1997	1998	1999
North Coastal	1997	1998	1999

LEGISLATION REQUIRED:

Preparation of these planning reports does not require new legislation. However, the Water Resources Planning Task Force is in the process of updating the *Massachusetts Water Supply Policy Statement* which was last revised in 1984. This policy emphasizes the need for long-range statewide planning as mandated by 313 CMR 2.00, and adopts supply and demand management policies in a balanced approach aimed at:

- providing for multiple uses;
- protecting water quality;
- assuring availability for consumptive and non-consumptive needs; and
- supporting local and regional capabilities to plan, construct, manage, and protect water supplies.

ESTIMATED COST:

The cost of preparing these reports will vary, depending on the size and development of a basin and complexity of water-related issues.

POTENTIAL FUNDING SOURCE(s):

Massachusetts Water Resources Commission.

TARGET DATE:

The river basin planning reports will be prepared in accordance with the EOE A basin schedule shown on the preceding page.

FURTHER INFORMATION:

For further information and assistance, contact:

DEM Office of Water Resources
(617) 727-3267

DEM ACTION #3.9:

The Department of Environmental Management should acquire and restore undeveloped coastal properties that offer outstanding living resources habitat and public recreation opportunities.

RATIONALE:

Only about one quarter of the Massachusetts coastline is in public ownership. As a result, many of the Commonwealth's prime coastal resources are vulnerable to degradation. In addition, only about 10% of the entire coast is truly accessible to all members of the public. This, combined with the Colonial Ordinance which limits public use of the intertidal zone to "fishing, fowling, and navigation," severely restricts public access to the shore. Protection of the Commonwealth's remaining unspoiled coastal areas should be a high priority for DEM's Land Acquisition Program.

RESPONSIBLE AGENT(s):

DEM's Land Acquisition Program staff will be responsible for planning and implementing future coastal acquisitions. In addition, DEM will be responsible for the Massachusetts Coastal Access Project, through which DEM will acquire public easements for pedestrian access across selected privately-owned intertidal areas along the coast.

The restoration of degraded coastal habitat acquired by DEM will be the joint responsibility of DEM's Waterways Program staff and Coastal Property Program staff, with assistance from appropriate federal and state agencies (e.g., EOE Wetlands Restoration and Banking Program), and citizen volunteers.

IMPLEMENTATION STRATEGY:

DEM has completed research to identify significant unprotected areas of the coast, and will target appropriate properties for acquisition. In addition, DEM will work to restore degraded coastal habitat through beach replenishment and dune stabilization. DEM also is analyzing the privately-held intertidal zone, and will identify selected areas where acquisition of right-to-walk easements would provide much-needed public access to the coast.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

\$15 million.

POTENTIAL FUNDING SOURCE(s):

1987 Open Space Bond Coastal Acquisition Account; 1996 Open Space Bond.

TARGET DATE:

Ongoing as opportunities arise.

FURTHER INFORMATION:

For further information and assistance, contact:

DEM Office of Natural Resources
(617) 727-3160
DEM Office of Waterways
(617) 727-3160

DEP RECOMMENDATION #3.10:

The Department of Environmental Protection should complete its statewide inventorying and mapping of coastal and inland wetlands, and provide local conservation commissions with: 1) accurate base maps depicting wetland boundaries, and 2) instruction on proper wetland map interpretation and use.

RATIONALE:

Despite the protection offered by the state Wetlands Protection Act and its Regulations, coastal and inland wetlands continue to be destroyed or degraded at an unacceptable rate. A recent study conducted in southeastern Massachusetts indicated that, between 1977 and 1986 alone, over 1,300 acres of freshwater wetlands were lost. The cumulative impacts of many small projects -- development of homes and businesses, construction of docks and piers, dredging of boating channels -- are often the most significant cause of wetlands loss and habitat decline. Contributing to these losses is the uneven administration and enforcement of wetlands regulations at the local level. This stems in part from a lack of reliable local wetlands information, especially wetland maps which accurately depict wetland boundaries. All too often, Conservation Commissions and other town boards must rely on wetland maps that are either sorely out-of-date or are produced at a scale inappropriate for site-level planning and decision-making. There is an urgent need for more current and consistent wetland maps that can be used both locally and regionally to identify and protect wetlands. At the same time, there is an urgent need for direct technical assistance to the local boards to ensure that they are properly interpreting and using the maps.

RESPONSIBLE AGENT(s):

The DEP Wetlands Conservancy Program (WCP) staff will be responsible for this action.

IMPLEMENTATION STRATEGY:

Funding permitting, the WCP staff will complete the inventorying and mapping of the Commonwealth's coastal and inland wetlands using recent aerial photography and photo interpretation. These updated wetlands maps will be used by state personnel to increase understanding of the extent and condition of the state's wetlands, and to improve coordination among DEP's regulatory programs which deal with wetlands and water quality issues. Equally important, the maps will serve as a new and valuable planning and management tool

for local Conservation Commissions and Planning Boards, regional planning agencies, watershed associations and land trusts, and private land owners.

The photos to be used in the mapping process are color infrared (CIR) aerial photos at the 1"=1,000' scale. These photos will be viewed, in stereo, by experienced interpreters from the Wetlands Mapping Unit at the University of Massachusetts. Wetlands will be delineated to a minimum size of one-quarter acre. Currently, the WCP has completed wetlands photo interpretation for over 40% of the state.

The base maps upon which the wetland delineations will be displayed are extremely accurate orthophoto maps at the 1"=417' scale. Because these maps are photo-based, they will show all the features of both the natural and human-made landscape. At this time, approximately 20% of the Commonwealth is covered by this type of base map. Statewide coverage is expected to be completed over the next several years.

As the wetland maps are produced, the DEP Wetlands Conservancy Program staff will present one set of maps, free of charge, to each community's Conservation Commission. The WCP will notify Conservation Commissions of the availability of the maps and will provide instruction on their proper interpretation and use. Additional copies of both the maps and the color infrared aerial photos will be available to other town boards and organizations at the cost of reproduction.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

One set of orthophoto wetlands maps will be given free of charge to each Conservation Commission. Additional maps will be available at a cost of \$10 per map. (On average, 5-7 maps will be required for complete coverage of a community.)

POTENTIAL FUNDING SOURCE(s):

1996 Open Space Bond.

TARGET DATE:

Funding permitting, the orthophoto wetlands maps for the following regions are projected to be available by the end of 1996:

Region

Metro/Suburban Boston
Buzzards Bay (West Shore)
MDC Watersheds (Sudbury, Quabbin, Wachusett)

Portions of North Shore (Ipswich, Rowley, and Parker
River Watersheds)
City of Cambridge Water Supply Watershed Area
Fort Devens Area
Merrimack Valley

FURTHER INFORMATION:

For further information and assistance, contact:

DEP Division of Wetlands and Waterways
(Wetlands Conservancy Program)
(617) 292-5907

DFWELE ACTION #3.11:

The DFWELE Division of Marine Fisheries should prepare an up-to-date inventory of anadromous fish runs in the Massachusetts Bays region and develop a strategy to prioritize, restore, and maintain these runs.

RATIONALE:

The Division of Marine Fisheries last surveyed the Commonwealth's anadromous fish runs in 1968-1970. A report on this survey, published in 1972, described individual coastal streams and their headwaters; identified obstructions to fish passage; assessed the condition of passage facilities; calculated the size of spawning areas; and developed a priority list for restoration. In the 25 years since this survey was conducted, many changes have occurred. New fishways were constructed while others have deteriorated; populations of anadromous fish were re-established while others have declined; and the character of many streams has changed due to agricultural, commercial, and residential development. In order to successfully manage the Commonwealth's anadromous fish resources, it is necessary to prepare an up-to-date inventory of anadromous fish runs. This inventory would serve as the basis for establishing a prioritized schedule for fish run restoration and maintenance.

RESPONSIBLE AGENT(s):

DMF is ultimately responsible for managing the Commonwealth's anadromous fish resources, although the authority to regulate individual fisheries can be assumed by municipalities under Section 94 of Chapter 130 of the Massachusetts General Laws. With 64 coastal streams within the Massachusetts Bays region, preparation of an updated Bays-wide inventory is a labor-intensive proposition that will require additional staff support, at least on a seasonal basis. The responsibility for restoration strategy development, and the actual restoration and maintenance of fish runs, can be delegated in part to the U.S. Fish and Wildlife Service by utilizing their fishway design capabilities and to municipalities through Section 94. In addition, DMF's evolving *Fishway Stewardship Program* (see DFWELE Action #2) is expected to provide a volunteer labor force to aid in cleaning, maintaining, and regulating fishways over the long term.

IMPLEMENTATION STRATEGY:

DMF will conduct a survey of the 64 coastal streams in the Massachusetts Bays region to determine their present condition and development potential as anadromous fish runs. Basic water quality parameters will be measured for each stream, obstructions to fish passage will be noted, and

the condition of existing fishways will be evaluated. The survey will be conducted during the period March 15 - May 15 in order to better confirm the presence or absence of anadromous fish species. DMF will use the 1972 survey report as a guide for designing the new survey, and will present the results in a similar format.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The estimated cost of this action is \$7,500, as follows:

Salaries	-	\$6,500
Transportation	-	500
Equipment	-	<u>500</u>
Total		\$7,500

POTENTIAL FUNDING SOURCE(s):

Federal Wallop-Breaux Funds

TARGET DATE:

1997/1998

FURTHER INFORMATION:

For further information and assistance, contact:

DFWELE Division of Marine Fisheries
(617) 727-3193

DFWELE ACTION #3.12:

The DFWELE Division of Marine Fisheries, in collaboration with the Riverways Program, should develop and implement a citizen-based *Fishway Stewardship Program* to restore and maintain anadromous fish runs along the Massachusetts Bays coast.

RATIONALE:

Massachusetts coastal streams contain over 200 constructed fishways. These structures allow the passage of a variety of freshwater and anadromous species, although they are primarily intended for use by river herring. DMF, acting under the authority granted by Section 19 of Chapter 130 of the General Laws, has the statutory responsibility to ensure that these structures are in place and functioning properly. After a half-century of continuous fishway construction, most spawning areas of significant size have again been made accessible, and the emphasis is now shifting to ongoing maintenance and repair.

With so many fishways in the Commonwealth, it is impossible for DMF's three-person construction crew to provide the annual attention needed to maintain optimum efficiency of passageways. The problem is exacerbated by the seasonality of the work and the conflicting demands placed on the crew's time by the added responsibilities of shad and alewife stocking.

In the early 1970's, DMF encouraged local control of alewife fisheries to shift some of the burden of fishways management to town government, while still retaining a degree of oversight. In some cases (usually towns with highly visible, income-producing fish runs), this has worked well. Under the leadership of the local herring warden or his/her counterpart, cleanup and repair of fishways are underway. Many other towns, however, have failed to react to the deterioration of their fishways. This failure is due largely to changing administrations, loss of individuals knowledgeable about alewife requirements, and the lack of financial resources during the current economic downturn. In a surprising number of instances, local officials are completely unaware that they have been granted control. The net result is that, while DMF can point to a few spectacularly successful runs, many of the smaller runs which cumulatively may contribute more to the total Massachusetts anadromous fish population are diminishing.

To remedy this problem, DMF, in collaboration with the Riverways Program, has initiated a program of ongoing citizen participation in fishways maintenance and repair. This program, called the *Fishway Stewardship Program*, seeks to enlist the existing broad base of volunteer support established under the "Adopt-a-Stream" program to help

DMF's staff improve and maintain the quality of local fish runs along the coast.

The *Fishway Stewardship Program* has the potential to provide the Commonwealth with an effective and economical means of upgrading and maintaining a large portion of its fishways. At the very least, it will provide a much needed watchdog task force to oversee the fish runs and detect problems which DMF can then respond to in a more timely fashion than was possible in the past.

RESPONSIBLE AGENT(s):

The Division of Marine Fisheries and the Riverways Program will share responsibility for implementing this action.

IMPLEMENTATION STRATEGY:

With the basic structure and operating procedures of the program now in place, the Riverways Program, with its already well-established network of Adopt-a-Stream volunteer organizations, is ready to take the lead in promoting the concept.

Riverways and DMF have prepared materials for distribution to groups that want to "adopt" fishways and become long term stewards of anadromous fish runs. Letters of agreement, to be signed by DMF and the volunteer organizations, will describe in detail the tasks to be delegated. DMF will provide onsite instruction and make regular inspections to assess the progress of the work and to correct any problems. In the case of locally controlled fisheries, all work will be cleared through the appropriate town officials. Participants will not be allowed to regulate water flow in public water supplies or water bodies used for agricultural purposes without prior consent of the user. Since local groups will be assigned to individual fishways, management plans specific to the needs of each fishway will be developed.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost of this program is expected to be negligible as the work will be performed by volunteers. Any incidental costs, such as for fishway replacement materials, will be borne by DMF, the towns, or affected landowners.

POTENTIAL FUNDING SOURCES:

Not applicable

TARGET DATE:

Several small-scale pilot projects have been underway since 1993, but the full-fledged, formalized program did not begin until 1995. The program will be developed further during 1996, at which time implementation will begin and will be an ongoing proposition.

FURTHER INFORMATION

For further information and assistance contact:

DFWELE Division of Marine Fisheries (Sandwich Office)
(508) 888-1155

DFWELE Riverways Program
(617) 727-1614

EOEA ACTION #3.13:

The Executive Office of Environmental Affairs should continue its innovative *Wetlands Restoration and Banking Program* to restore and protect degraded coastal and inland wetlands.

RATIONALE:

Wetlands provide numerous environmental and economic benefits to Massachusetts. Wetlands help to control flooding, protect the shoreline from storm damage, purify water supplies by filtering out pollutants and sediment, and provide recreational and educational opportunities. In addition, wetlands provide habitat that is essential for commercial fish and shellfish, as well as rare and endangered species. When wetlands are lost, many of these important functions must be provided by manmade facilities, such as wastewater treatment plants, dams, and shoreline protection structures. These facilities are expensive and often fail to replicate the natural wetland functions.

According to recent EOEa estimates, Massachusetts has lost more than 28 percent of its valuable wetlands acreage since Colonial times. In addition, because the state is densely developed, much of the remaining 600,000 acres is moderately or highly degraded. Although Massachusetts has been committed to wetlands protection for decades and has maintained a policy since the early 1990s of "no net loss in the short term, and a net gain in the long term," previous losses, current illegal filling, and continued degradation of wetlands all point to the need for an innovative and ambitious wetlands restoration program statewide.

RESPONSIBLE AGENT(s):

In June of 1994, U.S. Congressman Gerry Studds, Secretary of Environmental Affairs Trudy Cox, and other federal and state agency representatives signed a *Resolution to Restore Massachusetts Wetlands*. In signing the Resolution, Massachusetts launched a partnership with a host of federal agencies to restore lost and degraded wetlands throughout the state. Included in this partnership are representatives of the Federal Partners of Coastal America, whose purpose is to protect, preserve, and restore the nation's coastal systems by integrating appropriate federal programs and cooperating with state, local, and non-governmental efforts. Federal agencies belonging to the Coastal America partnership include the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the National Oceanic and Atmospheric Administration, and the U.S. Departments of Interior, Agriculture, Commerce, and Transportation. These agencies will participate in a coordinated approach to

restoring Massachusetts' wetlands that have been filled, drained, and polluted.

The Resolution calls for extensive scientific and citizen advisory committee input to develop a watershed-based wetlands restoration plan. This plan will outline how the cooperating agencies will work closely with communities to: set priorities for wetlands restoration; increase public awareness and support for restoration projects; undertake and complete restoration projects; and monitor these projects to ensure that program goals are met.

As stated by Representative Studds, "this effort represents a level of governmental cooperation that is unprecedented." The *Resolution to Restore Massachusetts Wetlands* establishes a partnership of not only the federal and state agencies that signed the Resolution, but other parties who wish to contribute to wetlands restoration. Partners will play a variety of roles in wetlands restoration, from funding studies to volunteering to plant marsh grass.

IMPLEMENTATION STRATEGY:

Under this Resolution, EOEa's Wetlands Restoration and Banking Program (WRBP) will initiate and coordinate the restoration of drained, filled, and polluted wetlands statewide. Many restoration projects are expected to result from the restoration plans developed under the Department of Environmental Protection Office of Watershed Management (OWM). OWM will use Geographic Information Systems (GIS) and field data, watershed by watershed, to: 1) evaluate water resources information; 2) consolidate and target permitting, enforcement, compliance, technical assistance, and grant programs; and 3) help communities develop wetland resource management strategies. Through this approach, OWM will directly involve communities in water resources decision making, such as choosing appropriate wetland restoration sites.

Unlike wetlands creation and restoration required under permits to compensate for wetlands destruction caused by construction and other activities, WRBP restoration projects may be initiated by project sponsors who simply want to restore Massachusetts' wetland heritage, solve community water quality and flooding problems, or restore wildlife habitat. Restoration project sponsors may be public agencies

(including Conservation Commissions), non-profit organizations, farmers, businesses, or other private landowners.

WRBP will work in partnership with communities, financial supporters, landowners, and project sponsors by:

- developing inventories of wetlands restoration sites, watershed by watershed;
- identifying and supporting project sponsors;
- helping sponsors establish clear goals for restoration projects;
- establishing scientific criteria and providing technical assistance;
- coordinating project funding;
- coordinating with other agencies;
- facilitating restoration work;
- evaluating and reporting project and program successes;
- maintaining a data base of restored wetlands; and
- ensuring that proposed restoration projects comply with state and federal wetlands laws.

As a parallel and complementary effort, WRBP will study the concept of wetlands "banking" as a means of improving the success of wetlands mitigation associated with unavoidable permitted wetlands loss and wetlands violations. A public advisory committee will be convened and broad public input will be sought before final decisions are made.

The Water Resources Commission has established a policy that: 1) mitigation banking shall be utilized to compensate for project impacts only when wetland impacts are unavoidable - that is, all measures have been taken to avoid and minimize such impacts or loss BEFORE mitigation of any kind is considered; and 2) wetlands banks shall not be viewed as an opportunity to propose wetlands fill or increase the amount of proposed fill for any project.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The costs of implementing this multi-year program are as yet undetermined, but are expected to be in the millions of dollars. Program costs support the following components:

- WRBP general operations (staff, travel, equipment, etc.);
- wetlands watershed restoration planning (data gathering, data analysis, public outreach);

- wetlands restoration projects (site assessment, project design, construction, monitoring);
- research; and
- program tracking and monitoring.

POTENTIAL FUNDING SOURCES:

The overall program will rely on a complex support network. At this time, funding for WRBP operations comes from the state operating budget, the state capital budget, and from federal grants. Funding for inventories, projects, and monitoring is expected to come from a variety of public and private sources, such as:

- Partners For Wildlife - USFWS;
- S.22 Planning Assistance to States - ACOE;
- Floodplain Management Studies - ACOE;
- MARSH Program - Ducks Unlimited;
- 319 Nonpoint Source Competitive Grants - DEP/EPA;
- 104(b)(3) Wetlands Grants - EPA/DEP;
- 104(b)(3) Stormwater Grants - EPA/DEP;
- Massachusetts Environmental Trust;
- ISTEA - FHA/MHD;
- National Fish & Wildlife Foundation Grants; and
- Open Space Bond.

TARGET DATE:

Wetlands restoration is an ongoing, long term effort. Developing detailed wetlands inventories for each watershed will take several years. WRBP will rely on those inventories to prioritize and select future projects. However, the important work of restoring the Commonwealth's wetlands resources cannot wait for completion of the inventories. Work on several restoration projects is already underway and WRBP is seeking additional restoration projects and project sponsors. The success of WRBP's wetlands restoration efforts will depend on an active and involved citizenry.

FURTHER INFORMATION:

For further information and assistance, contact:

EOEA Wetlands Restoration & Banking Program
(617) 727-9800 x213

EPA/NMFS/ACOE ACTION #3.14:

The Environmental Protection Agency, National Marine Fisheries Service, and Army Corps of Engineers should continue and expand their current efforts to support eelgrass habitat protection and restoration in Massachusetts and Cape Cod Bays.

RATIONALE:

Eelgrass (*Zostera marina* L.) is a submerged, narrow-bladed, grass-like plant which typically grows in the shallow, less disturbed waters of Massachusetts and Cape Cod Bays. This plant performs many important functions in the estuarine ecosystem. It is usually found in "beds," distinct ecosystems which provide breeding and nursery habitat for many finfish species, as well as for shellfish and crustaceans. It also is a food source for numerous species of wading birds and migratory waterfowl. In addition, eelgrass beds serve to both stabilize coastal sediments and filter suspended particulates and nutrients from surrounding waters. Finally, decaying eelgrass supplies significant quantities of organic material to the oceanic food chain.

These varied and important functions create significant economic value for the recreational and commercial fishing industries, the recreational hunting industry, and the tourism and service industries which support these activities. Further, due to its sensitivity to changes in water quality, eelgrass is an important indicator of the overall health of the estuarine ecosystem.

Research has identified four major factors affecting the health and expansion potential of eelgrass beds:

- 1) **General water quality degradation; reduced water clarity, in particular.** As water clarity is reduced, the depth to which light sufficient for eelgrass growth can penetrate is also reduced. Wastewater disposal, discharge of stormwater runoff, and faulty septic systems all can contribute to reduced water clarity;
- 2) **Elimination of suitable habitat.** Dredging, filling, and pier construction are examples of activities that can reduce or eliminate shallow water areas where eelgrass thrives;
- 3) **Conflicts with fishing and boating activities.** Propeller wash and fishing gear can uproot large areas of eelgrass; areas frequently exposed to this type of activity typically display non-vegetated bottom sediments; and
- 4) **"Wasting" disease.** This disease has been implicated in widespread eelgrass die-offs. However, neither the exact cause of the disease nor the conditions which trigger its outbreaks have been conclusively determined.

Given the obvious importance of these habitats to the economic and environmental health of the estuarine ecosystem, as well as the significance of the impacts to these habitats, it is important for all involved parties to support, enhance, and expand their protection, management, and restoration activities.

RESPONSIBLE AGENT(s):

The EPA, NMFS, and ACOE will continue to be the major responsible parties for these efforts, with support from other federal agencies (such as the U.S. Fish and Wildlife Service), state agencies, municipalities, research institutions, and nonprofit organizations.

IMPLEMENTATION STRATEGY:

For several years, EPA and NMFS have convened an annual technology transfer meeting for eelgrass researchers and regulators in New England, including those working within the Massachusetts Bays region. These two agencies will continue this effort, as it provides significant opportunities for the exchange of technical information, research results, and other pertinent data among the responsible agents. Further, EPA and NMFS, along with ACOE, will seek to capitalize on other opportunities to restore, protect, or manage eelgrass habitat, within their existing operating budgets.

LEGISLATION REQUIRED:

None.

ESTIMATED COST:

Minimal. The annual technology transfer meeting is covered by the current operating budgets of the participating organizations; in addition, the recommendation for any future action includes the stipulation that such action would occur within these current budgets.

POTENTIAL FUNDING SOURCES:

Agency and organization operating budgets, as previously noted, as well as contributions of cash and in-kind services from these participants.

TARGET DATE:

Ongoing.

FURTHER INFORMATION:

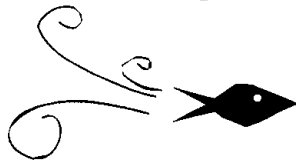
For further information and assistance, contact:

Environmental Protection Agency
(617) 565-3533

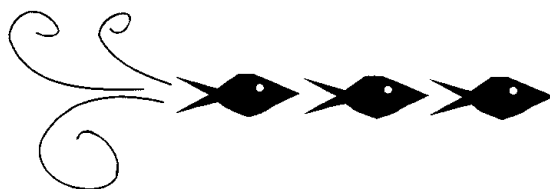
National Marine Fisheries Service
(508) 281-9204

Army Corps of Engineers
(617) 647-8231

chapter V



**Reducing and
Preventing
Stormwater
Pollution**



ACTION PLAN #4

REDUCING AND PREVENTING STORMWATER POLLUTION

Precipitation that falls on land either percolates into the ground or drains into streams, rivers, and, eventually, the sea. Although precipitation is often considered to be generally free of contaminants as it falls, in fact it can pick up a variety of contaminants from the air. As it pools on the ground and flows over the land, it picks up many more. Before reaching the sea, stormwater travels over countless streets, parking lots, lawns, golf courses, and farms. As it goes, it washes sediments, pathogens, nutrients, toxic metals, pesticides, and other organic compounds off the land, and eventually, into coastal waters.

In order to drain roadways efficiently and to eliminate or reduce local flooding, most urban and suburban areas are serviced by stormwater collection systems. These systems direct excess water through stormwater drains which connect to basins, ditches, or pipes. These, in turn, leach the runoff into the groundwater or divert it directly into a nearby surface waterbody. Of course, as it flows to the storm drains, the runoff collects debris, sediment, animal wastes, toxics, oil, and just about everything else that accumulates on city streets. If the collection system diverts the runoff into a coastal tributary, these contaminants will eventually reach, and degrade, nearshore waters.

In older urban areas, storm drains may lead to combined sewers which carry both stormwater runoff and municipal wastewater. During periods of wet weather, excessive stormwater can quickly overwhelm the combined sewer system's limited flow capacity. When this happens, the combined sewers overflow and discharge untreated sewage and stormwater directly into receiving waters. The sewage component of the overflow typically carries extremely high levels of pathogens and other wastewater contaminants.

Rural runoff also can contribute to water quality problems in the coastal zone. In areas that are not serviced by stormwater collection systems, most stormwater percolates into the soil and groundwater, where it is gradually released to rivers, wetlands, estuaries, and other surface water bodies. A portion of stormwater (up to 40 percent) can flow as unconsolidated sheets directly into surface waterbodies. Although sheet flow generally moves more slowly, and therefore carries less debris than urban runoff, it does carry away

pathogens, nutrients, and some sediments. In agricultural areas, it picks up toxics used in pesticides and herbicides, and in the same way, it washes fertilizer from suburban lawns and golf courses.

Development generally exacerbates stormwater impacts. By increasing the percentage of land that is paved or otherwise covered with impervious surfaces such as roads, parking lots, rooftops, and driveways, development reduces percolation, and increases both the volume and velocity of stormwater runoff. As stormwater flows increase, so too do the total contaminant loads reaching coastal waters and wetlands.

Historically, the institutional and statutory framework for regulating stormwater runoff has not been cohesive. Amendments to the Federal Clean Water Act of 1987 updated and revised the municipal and industrial stormwater discharge permit program, administered by EPA. This program (the National Pollutant Discharge Elimination System, or NPDES) applies to stormwater discharges from both large municipalities (population greater than 100,000) and to numerous types of industrial land uses. Given the sheer number of potential permits in this latter category, EPA actions have largely focused, and will continue to focus, on discharges of major environmental impact or those located in high priority resource areas. Additional efforts include general permits for industrial land uses.

Nevertheless, this picture has been changing in a positive way in recent years with the development of two strong and complementary nonpoint source pollution initiatives by the Massachusetts Coastal Zone Management Office (CZM) and the Massachusetts Department of Environmental Protection (DEP). These two state agencies share responsibility for developing and implementing the state's Coastal Nonpoint Program. They have worked closely with other state agencies, local officials, Regional Planning Agencies, non-profit organizations, and wide range of industry groups and affected individuals to develop a comprehensive and effective coastal nonpoint program. CZM has assumed the lead for developing this program and its associated action plan (*Coastal Nonpoint Pollution Control Plan*, or CNPCP) with support and coordination from DEP. The CNPCP contains comprehensive descriptions and explanations of the various federal

requirements mandated under s.6217 of the 1990 Coastal Zone Act Reauthorization Amendments. It also describes the specific strategies Massachusetts has developed to implement effective, enforceable stormwater and other nonpoint source (NPS) controls, as well as preventive planning. In support of these control and planning efforts, CZM is developing a technical guidance document, *The NPS Control Manual: Guidance for Local Officials, Planners, and Managers to Aid in Implementation of s.6217 Management Measures*.

Paralleling this effort, DEP, with assistance and coordination from CZM, has developed a comprehensive stormwater control strategy (the "Stormwater Initiative") to regulate stormwater discharges through existing environmental programs. For example, through its Office of Watershed Management (OWM), DEP will focus on enforcing stormwater discharges that require federal NPDES permits, as well as on conducting assessments and requiring remediation of other significant existing discharges. DEP also is drafting a series of stormwater management performance standards which will be implemented through the regulatory review and permitting processes of the Wetlands Protection Act and the s.401 Water Quality Certification Program. In support of this effort, DEP is developing a guidance manual, *Urban Best Management Practices for Massachusetts*, to explain these performance standards and provide technical and regulatory guidance to the regulated community and local officials.

Locally-developed stormwater controls can complement these stormwater regulations and prescribed performance standards originating at higher levels of government. Within well-established municipal authority, there are numerous methods to control water pollution associated with new development. One of the most effective methods of mitigating the impact of stormwater is through the adoption of regulations or bylaws designed to limit the loadings of bacteria, nutrients, and sediments. At the present time, few communities in the Massachusetts Bays region have adopted such regulations or bylaws.

A simpler method of controlling stormwater impacts is through the use of existing regulatory reviews. For example, under the provisions of the state Wetlands Protection Act (WPA), any development within or near a wetland must be reviewed by the local Conservation Commission. In order to mitigate the impact of stormwater on a nearby wetland or waterway, the Commission may condition its permit on appropriate measures to control both short-term construction impacts and long-term changes in runoff quantity and quality. One frequently imposed condition requires that developers use stormwater retention basins and/or leaching

fields to prevent an increase in the peak runoff rate. Although the Commission's authority to impose such conditions ends at the limits of the WPA, Planning Board review offers further opportunities for community input on stormwater mitigation. Subdivision regulations, for example, may provide guidelines for removing runoff from roads and paved areas, although currently these regulations are more often used to promote drainage efficiency rather than to protect water quality.

Municipalities can best prevent future stormwater impacts by implementing "best management practices" (BMPs) at the local level. Accepted BMPs include:

- *infiltration devices* to increase the percolation of stormwater into soil and thus decrease runoff volume. These devices may include porous pavement, soak-away pits or dry wells, infiltration trenches, percolation basins, and grass swales;
- *wet detention basins* to detain runoff and allow for settling of sediments and reduction of nutrients through biological processes; and
- *regular public works cleaning and maintenance* to remove sediment, debris, and associated contaminants from streets, catch basins, and storm sewers.

Of course, the most effective and most appropriate stormwater mitigation design will vary with individual site conditions, the type and use of receiving waters, and the cost of implementation.

Although local stormwater controls can minimize the impact of new development, there is really no easy or inexpensive way to reduce the impact of *existing* storm drains and ditches, which are present in large numbers throughout the Massachusetts Bays region. In some cases, it may be cost-effective to concentrate mitigation efforts on especially problematic point sources of stormwater runoff, such as those known to be impacting shellfish beds. However, such sources constitute only a small part of the total runoff problem, so long-term solutions will ultimately require broader scale remediation, sound land use planning, and proactive runoff control strategies. A collaborative effort between federal, state, regional, and municipal officials will be required to successfully address stormwater pollution in the Massachusetts Bays region.

The following recommended actions are an important step in this direction.

MUNICIPAL ACTION #4.1:

Municipalities should adopt subdivision regulations that require the incorporation of stormwater runoff best management practices (BMPs) into all new development plans.

RATIONALE:

Stormwater runoff from developed areas and construction sites is a major source of sediment, nutrients, and bacteria to Massachusetts Bays, and contributes to the closure of shellfish harvesting areas and swimming beaches. Over the past two decades, a number of stormwater runoff BMPs have been developed and refined to help mitigate adverse impacts associated with development activity. BMPs such as porous pavement for driveways or parking lots, infiltration basins, constructed wetlands, and grassed swales and filter strips can attenuate downstream flood flows and control the transport of pollutants from new development sites. By mandating such practices as a fundamental component of each subdivision development plan, communities can minimize further stormwater impacts to Massachusetts Bays and its living resources.

RESPONSIBLE AGENT(s):

Local Planning Boards will have primary responsibility for this action, but should solicit the advice and assistance of other local authorities -- Conservation Commissions, town engineers, DPW or highway departments, Boards of Health -- that are also concerned with stormwater management. Technical assistance in drafting the regulations is available from the Regional Planning Agencies (RPAs). In addition, the DEP Nonpoint Source Program can offer specific guidance on performance standards. Involvement of these agencies can help ensure consistency of regulations between communities which share watersheds or embayments.

IMPLEMENTATION STRATEGY:

Model stormwater management regulations are available from a variety of sources, including the RPAs and the DEP Nonpoint Source Program, and these can serve as useful guides in developing regulations tailored to local conditions. Such regulations generally emphasize retention and treatment of stormwater on-site via source controls and best management practices, and contain: 1) minimum design and/or performance standards to prevent the generation and transport of stormwater pollutants off-site; and 2) inspection and maintenance requirements to ensure the structural integrity and pollutant removal efficiency of BMPs during and after construction of a project. Because stormwater often impairs water resources and habitats shared by multiple

jurisdictions, it is imperative that communities coordinate their actions to ensure successful implementation at the natural resource, rather than individual town, level.

LEGISLATION REQUIRED:

This action requires new or upgraded local stormwater management regulations, adopted by Planning Boards as an addition to their existing subdivision rules and regulations.

ESTIMATED COST:

The cost of developing and adopting the new regulations should be minimal. Model regulations are available that can be incorporated either in their present form or with minor modifications to reflect individual community needs. Technical assistance in drafting the regulations is available from the Regional Planning Agencies, DEP Nonpoint Source Program, and Natural Resources Conservation Service (formerly Soil Conservation Service) Community Assistance Unit.

POTENTIAL FUNDING SOURCE(s):

Local revenues

TARGET DATE:

1996/1997. This is a high priority action from a water quality standpoint, and should be implemented by Planning Boards as soon as possible to prevent additional discharges of untreated stormwater runoff from new development sites.

FURTHER INFORMATION:

For further information and assistance, contact:

Your area's Regional Planning Agency
DEP Nonpoint Source Program
(617) 292-5597
Natural Resources Conservation Service
(508) 295-1481

MUNICIPAL ACTION # 4.2:

Municipalities should implement best management practices to mitigate existing stormwater discharges that are causing or contributing to the closure of shellfish harvesting areas and swimming beaches.

RATIONALE:

Sanitary surveys conducted by the Division of Marine Fisheries (DMF), the Department of Environmental Protection (DEP), and others have documented the presence of hundreds of known and suspected stormwater pollution sources along the Massachusetts Bays' coast. These sources, including storm sewers and drainage ditches, have been found to be major contributors of bacteria and other pollutants to coastal waters, and are a leading cause of shellfish bed and swimming beach closures. Mitigation of these sources through the application of appropriate BMPs is essential to reclaiming and preserving these resources for present and future use.

RESPONSIBLE AGENT(s):

Stormwater mitigation projects can be complicated and costly, and will generally require the participation and commitment of property owners and a number of local authorities, including chief elected officials, public works officials, harbormasters, shellfish officers, boards of health, and Conservation Commissions. Representatives of these groups should take the lead on local stormwater mitigation projects through the formation of "Water Quality Task Forces" or "Coastal Pollution Control Committees." Technical assistance, including assessment of water quality data and design of best management practices, is available from DMF, DEP, the Natural Resources Conservation Service/MassCAP (formerly Soil Conservation Service), and Regional Planning Agencies.

IMPLEMENTATION STRATEGY:

Before actual mitigation can begin, the Water Quality Task Forces will need to inventory, evaluate, and prioritize storm drain problems based on their effect on critical resources and the technical feasibility and cost of mitigation. This would include seeking out and eliminating illegal sewer connections to storm drains. (The Boston Water and Sewer Commission, in particular, has been successful in reducing local pollution problems on beaches by eliminating illegal sewer connections.) Communities sharing an embayment or affected resource area should coordinate their efforts to

ensure that the mitigation project will result in the reopening or substantial improvement of shellfish beds or swimming beaches.

Following the prioritization of storm drain problems, the Water Quality Task Forces will need to evaluate the mitigation options available, then select, design, and implement BMP(s) appropriate for the conditions at hand. Throughout this process, DMF and Natural Resources Conservation Service/MassCAP personnel can work cooperatively with the municipalities (as they did recently in assessment projects in Ipswich and Gloucester), providing technical information and engineering expertise not available locally. DEP's Nonpoint Source Program staff and CZM's Coastal Nonpoint Program staff can provide information on BMPs and performance standards as well as technical assistance.

LEGISLATION REQUIRED:

New legislation is not required unless a community seeks to establish a special stormwater utility district, in which case two-thirds majority approval by both houses of the State Legislature is required.

ESTIMATED COSTS:

Costs for stormwater treatment facilities (sediment basins, constructed wetlands, peat-sand filtration systems, etc.) vary widely, depending on such factors as drainage and impervious surface area, land use, soils, cost of land rights or easements, and maintenance requirements. Design and permitting costs can range from 50% to over 100% of construction costs. (At the high end of such costs would be retrofitting of storm drain outlets just above the high tide line, for example.) Construction costs range from under \$10,000 to over \$30,000 per impervious acre treated.

POTENTIAL FUNDING SOURCES:

Potential sources of funds include: Section 319 Nonpoint Source Program grants available from the DEP; State Revolving Fund (SRF) loans, available from the DEP;

ISTEA "Enhancement" funds available from the Massachusetts Highway Department; Coastal Pollution Remediation Program (CPR) funds available from CZM; and stormwater utility fees. (The latter require prior Legislative approval of special stormwater utility districts.)

TARGET DATE:

1996 and as funds permit. This is a high priority action from a water quality standpoint, and should be implemented by municipalities as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

Your area's Regional Planning Agency
DEP Nonpoint Source Program
(617) 292-5597
CZM Coastal Nonpoint Program
(617) 727-9530
Natural Resources Conservation Service
(508) 295-1481

DEP ACTION #4.3:

The Department of Environmental Protection, in collaboration with Regional Planning Agencies, Natural Resources Conservation Service/MassCAP (formerly U.S. Soil Conservation Service), and Massachusetts Coastal Zone Management Office, should: 1) disseminate its *Nonpoint Source Management Manual* and *Urban Best Management Practices for Massachusetts*, and 2) sponsor public workshops to educate local officials about best management practices and performance standards for controlling stormwater runoff.

RATIONALE:

The Department of Environmental Protection (DEP), through its Nonpoint Source Program, has produced and distributed an excellent general guidance document for local officials, entitled *Nonpoint Source Management Manual – A Guidance Document for Local Officials*. A second guidance document, *Urban Best Management Practices for Massachusetts*, is in preparation.

The first of these documents, commonly referred to as the *Megamannual*, offers general guidance on the management of a broad range of diffuse, largely unregulated, *nonpoint* sources of pollution, such as stormwater runoff, landfill leachate, and agricultural runoff. It is intended to provide local officials with the framework for developing a community-based *Nonpoint Source Management Plan* that is tailored to each community's individual circumstances and needs. Such a plan can serve as a blueprint for initiating and directing local actions that will protect and manage water resources and related land uses. The plan also can be used to document the need for, and identify sources of, financial, planning, and technical assistance. The ultimate goal is to prevent and mitigate nonpoint source pollution, with the emphasis on *prevention*. Without exception, pollution prevention and source reduction have proven to be more effective and less costly than remedying a problem after the fact.

The second guidance document, *Urban Best Management Practices for Massachusetts*, is still in development and will provide technical details and design recommendations for acceptable stormwater control practices. It also will provide performance standards that must be met, including standards for reducing annual loadings of total suspended solids by 80 percent. The guidance will not mandate the implementation of specific practices, however. All of the performance standards will be consistent with CZM's s.6217 management measure requirements, and the development of the DEP document is being closely coordinated with CZM and other agencies.

Broader outreach, including hands-on workshops, is needed to ensure that both the *Megamannual* and *Urban Best Management Practices for Massachusetts* reach their intended audience (i.e., Planning Boards, Boards of Health, Conservation Commissions, Public Works Departments, and other local stormwater management practitioners), and that their pollution control recommendations are understood and implemented.

RESPONSIBLE AGENT(s):

DEP's Nonpoint Source Program staff will have primary responsibility for this action, but should seek the advice and assistance of the Regional Planning Agencies, Natural Resources Conservation Service/MassCAP, and CZM's Coastal Nonpoint Program.

IMPLEMENTATION STRATEGY:

Under the direction of DEP's Nonpoint Source Program staff, the above agencies should jointly develop a strategy for financing and holding a series of regional workshops aimed at educating local officials about best management practices (BMPs) and performance standards to control stormwater runoff and other nonpoint sources of pollution. The workshops should be specifically targeted to Chief Elected Officials, Planning Boards, Boards of Health, Conservation Commissions, Public Works Departments, and other municipal authorities who play a key role in local pollution control policies, regulations, and practices. The workshops should be held at convenient locations and should be extensively advertised via press releases, direct mailings, and telephone calls in order to maximize community participation. The five Local Governance Committees (LGCs) of the Massachusetts Bays Program should be explored as a vehicle for co-sponsoring and promoting the workshops.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

\$5,000 per regional workshop (includes additional copies of both the *Megamanual* and *Urban Best Management Practices for Massachusetts*, and handout materials tailored to individual boards and departments).

POTENTIAL FUNDING SOURCE(s):

DEP Nonpoint Source Program; CZM Coastal Nonpoint Source Program; Massachusetts Highway Department surface transportation enhancement (ISTEA) funds.

TARGET DATE:

Planning and development of workshops and handout materials - 1996/1997
Publicizing and holding of workshops - 1997/1998

FURTHER INFORMATION:

For further information and assistance, contact:

Your area's Regional Planning Agency

DEP Nonpoint Source Program

(617) 292-5500

CZM Coastal Nonpoint Program

(617) 727-9530

Natural Resources Conservation Service

(508) 295-1481

DEP ACTION #4.4:

The Department of Environmental Protection should develop a coordinated and streamlined regulatory system within DEP to assure effective implementation of the stormwater components of the Massachusetts Clean Water Act, Wetlands Protection Act, and Federal Stormwater Program (Federal Clean Water Act, Sections 401 and 402).

RATIONALE:

Overlapping regulatory authority on stormwater permitting has given rise to conflicting standards and a confusing, inefficient bureaucracy. Stormwater needs to be regulated with "less process and more protection" so that the DEP can direct its limited resources where they will be most effective.

Accordingly, DEP's Stormwater Initiative will implement a regulatory and outreach program designed to address the discharge of untreated stormwater runoff by promoting effective stormwater management practices. This program will simplify the existing system, which is currently inefficient and confusing for regulated parties and regulators alike. The goal is a streamlined, enforceable, and predictable permitting process which will improve water quality and decrease flooding impacts, leading to both economic and environmental benefits.

With the assistance of an Advisory Committee, DEP has drafted proposed stormwater performance standards to establish uniform criteria for adequate stormwater management for use as Department-wide guidance. These standards are intended to be consistent with the Surface Water Quality Standards, the requirements of the Wetlands Protection Act, and the regulations to protect drinking water supplies. The standards establish design criteria that will require implementation of stormwater management systems to reduce water quality and flooding impacts.

RESPONSIBLE AGENT(s):

DEP's Bureau of Resource Protection (BRP), assisted by an Advisory Committee, will be responsible for this action.

IMPLEMENTATION STRATEGY:

The DEP Advisory Committee has reviewed the agency's existing organizational responsibilities, policies, and standards relative to stormwater pollution control, and has

recommended improvements that will lead to a more coordinated and streamlined regulatory system within the Department. Initiatives to be undertaken tentatively include the following:

- Development and adoption of BRP stormwater performance standards which, if met by project proponents, will protect the interests of the Wetlands Protection Act and eliminate the need for a surface water discharge permit.
- Establishment of a review process that encourages Conservation Commission use of the adopted BRP performance standards when writing local Orders of Condition; dissemination of BMP guidance materials to project proponents proposing stormwater discharges; and targeting of certain large projects for individual review using the MEPA thresholds.
- Setting of stormwater management priorities, beginning with the impact of highway runoff within public water supply watersheds and areas discharging to closed or threatened shellfish beds.
- Addressing existing stormwater discharges within the basin framework established by the Office of Watershed Management (OWM).

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

\$40,000.

POTENTIAL FUNDING SOURCE(s):

DEP Nonpoint Source Program funds; Section 104(b)3 stormwater funds (currently being used).

TARGET DATE:

This action is expected to be implemented by DEP according to the following schedule:

<u>Task</u>	<u>Projected Completion Date</u>
Develop/adopt stormwater performance standards	Spring 1996
Develop BMP manual and related guidance	June 1996
Revise policies/regulations	June 1997
Prepare/distribute outreach materials	Winter-Spring 1996
Select implementation target areas (as part of EOEAOWM basin program)	1996

FURTHER INFORMATION:

For further information and assistance, contact:

DEP Bureau of Resource Protection
(617) 556-1172

EPA ACTION # 4.5:

The Environmental Protection Agency should reduce stormwater pollution in the Massachusetts Bays watersheds through: (a) technical assistance to communities in developing comprehensive stormwater management programs; and (b) National Pollutant Discharge Elimination System (NPDES) compliance for industrial stormwater dischargers. Targeted areas are the lower Charles River for the stormwater management programs and the Neponset River for the industrial stormwater dischargers.

RATIONALE:

Typically, water which runs off from developed areas such as lawns, streets, parking lots, and construction sites during storm and melting events ("stormwater runoff") carries numerous contaminants, including nutrients, bacteria, and solids. In particular, runoff from residential areas is usually less polluted than that from industrially developed facilities, as the latter often carries metals, oils and grease, and other toxic substances from material storage locations, parking lots, and related facilities. In either case, the runoff is frequently directed to a wetland, waterway, or waterbody where these contaminants are discharged. Adverse impacts to these sensitive ecosystems from the released contaminants include algal blooms, decreased dissolved oxygen levels, and sedimentation.

While numerous remedial and preventive "best management practices" (BMPs) exist to minimize water quality impacts from stormwater runoff, their implementation is enhanced when undertaken through a comprehensive stormwater management program. These programs will be prepared on a community-by-community basis along the lower Charles River as part of the EPA's initiative to restore this portion of the river to fishable and swimmable status by 2005. Due to its urban nature, the lower Charles River receives significant quantities of polluted runoff from developed areas, leading to poor water quality. Accordingly, the comprehensive programs will address related issues such as pollutant source identification and prevention, as well as design and implementation of appropriate BMPs. These programs will be developed in conjunction and coordination with related efforts such as the MBP and DEP's Basin Team, within EPA's position to offer technical assistance where needed or required.

Stormwater runoff is also a significant water quality problem in the Neponset River. The Neponset River watershed has served as the pilot project for the Massachusetts Department of Environmental Protection's (DEP) assessment, planning, and implementation efforts that comprise the state's Watershed Initiative. In support of this Initiative as well as

community-based efforts, EPA will work with industrial dischargers to build compliance with the NPDES stormwater program. Through a permitting process in this program, certain industrial facilities which discharge stormwater into wetlands, waterways, and waterbodies are required to implement BMPs to improve the quality of their discharges.

RESPONSIBLE AGENT(s):

The initiative to improve water quality in the lower Charles River will be guided and monitored by EPA's "Clean Charles Task Force," comprised of state agencies, local communities, and environmental groups. With respect to NPDES compliance, EPA will be primarily responsible for supporting outreach and permitting industrial discharges in the Neponset River watershed, with continued coordination with the Massachusetts DEP.

IMPLEMENTATION STRATEGY:

No major organizational efforts are needed to implement these recommendations in the specified areas; EPA has already created the Clean Charles Task Force and has been a participant in the Watershed Initiative/Neponset pilot project since its inception.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The financial resources necessary to support the EPA staff charged with carrying out these recommended actions are currently being considered for inclusion in the agency's operating budget.

POTENTIAL FUNDING SOURCE(s):

Agency and organizational operational budgets, as well as potential contributions of cash and in-kind services from participants.

TARGET DATE:

Ongoing.

FURTHER INFORMATION:

For further information and assistance contact:

EPA - New England
(617) 565-4422

MHD ACTION # 4.6:

The Massachusetts Highway Department should prepare an *Environmental Manual* to complement its *Highway Design Manual* and provide for the integration of environmental considerations (including stormwater management) into all phases of highway project planning, design, construction, and maintenance.

RATIONALE:

In 1989, the Massachusetts Highway Department (formerly the Massachusetts Department of Public Works) issued a comprehensive *Highway Design Manual* to guide the planning and design of all highway construction, reconstruction, and rehabilitation projects for which the Highway Department is responsible. This manual describes the highway design process and prescribes specific criteria to be used by Department engineers and consultants in designing projects to meet all necessary transportation service and public safety requirements. Among the criteria are a series of drainage and erosion control measures that are intended to prevent or minimize project-related flooding, erosion, and sedimentation, both on-site and downstream. While these criteria give considerable attention to controlling the *hydraulic* aspects - i.e., the volume and rate - of stormwater runoff, they do not adequately consider the *water quality* aspects of stormwater runoff (especially in light of the recent advancements in the application of stormwater Best Management Practices). As a result, some highway projects are failing to achieve the stormwater pollutant removal efficiencies that are necessary to safeguard inland and coastal water quality. A comprehensive *Environmental Manual* to complement the Highway Department's *Highway Design Manual* is needed to ensure the integration of environmental considerations, including stormwater quality control, into all phases of highway project planning, design, construction, and maintenance. In addition to serving the specific needs of the state Highway Department engineers and consultants, this manual could also be a valuable guidance document for *local* public works personnel.

RESPONSIBLE AGENT(s):

MHD's Environmental Division will be responsible for this action.

IMPLEMENTATION STRATEGY:

Preparation and implementation of the *Environmental Manual* will be pursued in accordance with the following work elements:

1. Development of a Targeted Outreach Program to identify the goals and responsibilities of the Highway Department, applicable regulatory agencies, and environmental advocacy groups, and to identify regional environmental issues to be considered in the development and maintenance of corridor-specific roadway and bridge projects and maintenance of facilities.

This outreach program will consist of meetings with applicable Division and District staff of the Highway Department, the Massachusetts Executive Office of Transportation and Construction, and all regulatory branches of the federal and state agencies which have permit responsibilities for highway and bridge projects. Agencies such as the Federal Highway Administration, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the Massachusetts Environmental Policy Act (MEPA) Unit, and the Massachusetts Department of Environmental Protection will be included. A professional facilitator will be provided through a consultant contract to moderate the meetings with regulatory agencies and advocacy groups in order to maintain focused discussions on agency purpose and need and on general regulatory requirements, rather than on project specific discussions.

Targeted environmental advocacy groups will include watershed associations, the Massachusetts Association of Conservation Commissions, and the Massachusetts Bays Program Coastal Advocacy Network.

A committee of Highway Department staff selected by the chief Engineer and chaired by the Environmental Project Manager will participate in these outreach meetings. Representation will consist of the appropriate MHD Divisions and Bureaus and all District offices.

The information gained through these meetings will be used in the development of the *Environmental Manual* as described in elements 2 through 4, below, and will also be used to develop environmental resource guides for each District. These resource guides will provide information on the priority environmental concerns within each region of the State and will serve as a focus for design alternatives analysis.

2. Preparation of the main body of the *Environmental Manual* to include:

- Environmental Policy Directive for Department activities; and
- Identification of the specific tasks and level of effort of environmental review, documentation, design considerations, and best management practices for all phases of project advancement from planning through construction and maintenance.

Coordination and review of each section of the *Environmental Manual* will be undertaken with the District Highway Directors and applicable Divisions and Bureaus within Headquarters to insure that the policies and procedures properly reflect the mission of the Department to design, build, and maintain a safe and efficient highway system for the general public.

3. Preparation of Guidance and Directive on the preparation of all permits and regulatory compliance actions required for highway and bridge projects.

For all permits and compliance actions that may be required by a highway or bridge construction/ maintenance project, guidelines will be developed which will detail the type and extent of information, documentation, coordination, and plans needed to complete a permit/compliance application.

4. Preparation of Training Modules for use by the Environmental Division and others for conduct of training for Department personnel and consultants.

To effectively implement the *Environmental Manual*, training will be provided to both Department personnel and consultants on a regular basis. Such training will be offered in the form of training modules with appropriate graphics and resource materials.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

\$430,000

POTENTIAL FUNDING SOURCES:

Federal Highway Administration Statewide Planning and Research (SPR) funds.

TARGET DATE:

1996-1997.

Preparation of the *Environmental Manual* began in 1994 and is expected to be completed in 1996. Development and presentation of the training modules and accompanying resource materials are planned for 1996/1997.

FURTHER INFORMATION:

For further information and assistance contact:

MHD Environmental Division
(617) 973-7309

MHD ACTION #4.7:

As part of its forthcoming pollution prevention plan, the Massachusetts Highway Department should develop a *Stormwater Pollution Mitigation Program* to identify, prioritize, and correct existing stormwater pollution problems associated with state highway drainage facilities.

RATIONALE:

In 1994, Governor Weld issued Executive Order 350, known as the "Clean State Order." Under this Order, state agencies were directed to identify all existing and potential environmental problems associated with state facilities and properties. A cooperative inter-agency effort was initiated to identify, prioritize, and correct these problems. The technical expertise of state employees of all agencies was pooled to implement an effective program of environmental compliance.

A major component of the Executive Order is the preparation of Pollution Prevention Plans for each agency. These plans prescribe preventive measures that can be taken to insure that future violations do not occur, and identify pro-active measures which can be implemented to improve the environmental sensitivity of each agency's actions.

Currently, state roadway and bridge projects are selected solely on the basis of safety and operational criteria. Unsafe conditions or structural deficiencies dictate priorities for action. These criteria are seen as having paramount importance because the State Highway Department has been specifically charged by the Legislature with providing a safe and efficient roadway system for the transport of people and goods. Indeed, this is the Department's primary mission. Nevertheless, other criteria could be added to the selection process, and the analysis of existing roadway deficiencies could be broadened to include consideration of stormwater pollution problems associated with state highway facilities.

Above the agency level, the Commonwealth as a whole has a broad mission to insure the safety and well-being of the public. This mission includes protection of water and other environmental resources. Within each agency's areas of responsibility, then, consideration of the statewide public interests should be integrated with the assigned agency mission.

The Massachusetts Highway Department currently incorporates stormwater best management practices (BMPs) as part of the design process on individual projects. However, this is a piecemeal approach and its impact on improving water quality statewide is extremely limited. A pro-active, agency-wide program should be developed to identify existing stormwater pollution problems statewide, prioritize these problems for corrective action, and incorporate this prioritization scheme into the project selection process.

Since the Highway Department has jurisdiction over thousands of miles of roadway throughout the state -- roadways which traverse every major watershed and many water supply zones of contribution -- implementation of such a stormwater mitigation program could have a major beneficial impact on water resources statewide.

RESPONSIBLE AGENT(s):

The Commissioner of the Massachusetts Highway Department is responsible for establishing policy for the agency, and the Chief Engineer implements these policies through the various Divisions and Districts. A commitment should be made by the Commissioner to establish stormwater pollution mitigation as an environmental priority for the agency. The Chief Engineer would then direct the appropriate Division within MHD to take the lead in developing a Stormwater Pollution Mitigation Program.

IMPLEMENTATION STRATEGY:

The *Environmental Manual* to be developed by the Department (see MHD Action #1) would provide the appropriate vehicle for developing the framework for the Stormwater Pollution Mitigation Program. The Scope for the proposed *Environmental Manual* includes an outreach component

which will bring together a wide range of environmental agencies and advocacy groups. Their collective expertise on stormwater management could be tapped to help develop the Stormwater Pollution Mitigation Program.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

Development of the Stormwater Pollution Mitigation Program could be undertaken as part of the *Environmental Manual* project, for which funding is currently being pursued.

Implementation of the program -- i.e., correction of the stormwater problems statewide -- is expected to cost many millions of dollars. This could be programmed into each year's transportation budget through the Bond Bills submitted to the Legislature every few years. This would spread out the cost and minimize the financial impact on the general public.

POTENTIAL FUNDING SOURCE(s):

The Transportation Bond Bills provide state funds for projects undertaken by the transportation agencies. The 1994 Bond Bill passed by the State Legislature provides approximately \$1 million for the retrofitting of stormwater systems for the purpose of mitigating pollution. Future Bond Bills should continue to incorporate similar requests.

The Federal Transportation Bond, known as ISTEA (Intermodal Surface Transportation Efficiency Act), is the funding source for projects eligible for federal aid. Use of these funds for improvements to drainage systems is permissible when such improvements are part of a larger roadway project. In addition, a new category of funds, "Enhancement Funds," can provide grants for projects which fall within certain specified categories. Stormwater pollution mitigation is one of those categories.

TARGET DATE:

The identification and prioritization of existing stormwater pollution problems is expected to be completed by MHD during 1996, with implementation proceeding as priorities are established and as funds become available.

FURTHER INFORMATION:

For further information and assistance, contact:

MHD Environmental Division
(617) 973-7309

MHD ACTION #4.8:

The Massachusetts Highway Department should sponsor annual workshops to train local public works personnel on the proper use of stormwater runoff Best Management Practices.

RATIONALE:

The traditional thinking behind highway design has been to remove stormwater runoff from the paved surface as quickly as possible and discharge it directly to the nearest stream, pond, or wetland. While it remains essential for public safety purposes to remove stormwater from road surfaces as quickly and efficiently as possible, it is now recognized that the direct discharge of runoff to water courses can have a serious long-term impact on water quality. Runoff from roadways carries a wide array of contaminants, including solids, nutrients, heavy metals, oil and grease, and bacteria. These contaminants contribute to the degradation of our coastal and inland waters and the closure of shellfish beds and swimming beaches.

Best management practices (BMPs) for stormwater have been proven to substantially improve the quality of roadway runoff. Stormwater BMPs include both nonstructural and structural measures. Nonstructural measures refer to such practices as street sweeping and catch basin cleaning, and the controlled use of fertilizers, pesticides, and deicing compounds. Structural BMPs include *storage controls* such as detention and retention basins, *infiltration practices* such as infiltration basins and trenches, porous pavement, and leaching catchbasins, *vegetative controls* such as grassed swales and vegetative filter strips, and *artificial wetlands*. These measures are generally both cost effective and reasonably simple to implement.

Because municipal public works and highway departments rely heavily on the standard design practices prescribed by the Massachusetts Highway Department in its *Highway Design Manual*, there has been a general reluctance to implement innovative and alternative solutions to runoff management. However, an effective statewide stormwater management program must incorporate a wide array of both traditional and innovative solutions. It must also involve active participation by the municipalities as well as the MHD. Inasmuch as the municipalities look to the State Highway Department for guidance on roadway and drainage design, MHD is the appropriate authority to provide direct ("hands-on") instruction on stormwater BMPs to local public works personnel.

RESPONSIBLE AGENT(s):

The Chief Engineer of the Massachusetts Highway Department is responsible for establishing engineering design policy. This individual should direct MHD's Environmental Division and Highway Engineering Division to develop an appropriate guidance document on stormwater BMPs for roadway design and to issue this guidance as an Engineering Directive. The MHD Environmental Division should then coordinate with the Bay State Roads Program to develop a series of regional workshops targeted to municipal highway personnel. The Bay State Roads Program is a technology transfer program that provides continuing education on issues relevant to local highway departments.

IMPLEMENTATION STRATEGY:

At the direction of the Commissioner and the Chief Engineer, the MHD Environmental Division should develop a scope of work for the preparation of a guidance manual on stormwater BMPs for roadways. Funding for the manual should then be secured and a contract let. The effort should be coordinated with other agencies that are also concerned with, and knowledgeable about, stormwater management, including CZM, DEP, and the Natural Resources Conservation Service/MassCAP (formerly Soil Conservation Service).

LEGISLATION REQUIRED:

New legislation is not required. The Transportation Bond Bill passed by the Massachusetts Legislature this year provides the matching funds needed to access federal research monies for this action. (See "Potential Funding Source(s)", below.)

ESTIMATED COST:

Development of the BMP guidance manual and training workshops for local DPW personnel is estimated at under \$50,000.

POTENTIAL FUNDING SOURCE(s):

The most likely source of funds is Federal SPR (research) funds. The Deputy Secretary for Environmental Policy in the Executive Office of Transportation and Construction (EOTC) has begun the application process to obtain these funds.

TARGET DATE:

Development of the BMP guidance manual can begin when funds are secured. It is anticipated that this work will be completed in 1996 and that three regional workshops for local highway personnel will be offered in 1996/1997 and annually thereafter.

FURTHER INFORMATION:

For further information and assistance, contact:

MHD Environmental Division
(617) 973-7309

MHD/MDC ACTION #4.9:

The Massachusetts Highway Department and the Metropolitan District Commission should require the use of on-site stormwater Best Management Practices as a precondition to the permitting of private property tie-ins to state drainage facilities.

RATIONALE:

Many areas of Massachusetts are densely developed, and the options for installing new drainage systems are limited. Drainage systems for commercial and industrial sites in particular often face severe areal and topographical constraints. Often, the only recourse is to "tie in" to an existing drainage facility. When these facilities are under the jurisdiction of a state agency, permits are required.

Traditionally, the principal criterion for permitting private party tie-ins to a state drainage system is one of hydraulics -- i.e., will the system be able to handle the additional volume of runoff? If it can, the tie-in is generally permitted, regardless of whether on-site stormwater retention or treatment measures have first been employed.

As our focus on stormwater management broadens to include water *quality* considerations, it becomes increasingly important to reach beyond just the hydraulic capabilities of a public drainage facility and look toward influencing site design on properties abutting the public facility. As stormwater regulations are strengthened, more and more public revenues will be spent on redesigning and retrofitting the existing stormwater systems on public roadways. The public should not be expected to bear the added burden of mitigating stormwater pollution from private developments as well.

Requiring the implementation of stormwater best management practices (BMPs) as a precondition to a private party's tying into a state facility is no more burdensome than the conditions placed on wastewater and other effluent discharges to Publicly Owned Treatment Works. The cost of implementing on-site BMPs has been shown to be minimal when compared to the public cost of remediating polluted stormwater discharges or of retrofitting existing storm drainage systems.

RESPONSIBLE AGENT(s):

The Commissioner and the Chief Engineer of the Massachusetts Highway Department and the Commissioner of the Metropolitan District Commission are responsible for setting policy for their respective agencies. These public officials should direct the appropriate personnel within their

agencies to develop water quality related performance criteria for use in evaluating and permitting private property tie-ins to state drainage facilities.

IMPLEMENTATION STRATEGY:

The process for developing water quality-related permit criteria for drainage system tie-ins should be a cooperative effort between the MHD and MDC. Consistency in permit requirements between the two state agencies would benefit the general public and the development community.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The development of water quality-related performance criteria can be accomplished through the environmental and permitting staff of the respective state agencies. Other than the cost of employee salaries for the time involved, no additional funds should be necessary.

POTENTIAL FUNDING SOURCE(s):

Not applicable.

TARGET DATE:

The development of the new permit criteria, including the required coordination between MHD and MDC and consultation with other agencies as appropriate, is expected to be accomplished in 1996.

FURTHER INFORMATION:

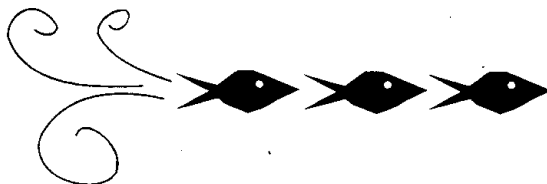
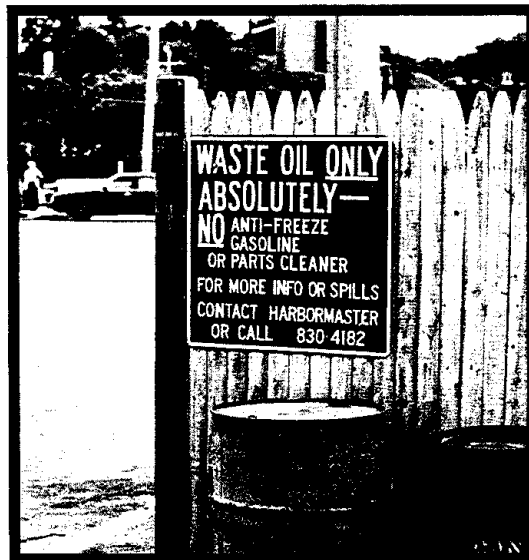
For further information and assistance, contact:

MHD Environmental Division
(617) 973-7309

chapter V



**Reducing and
Preventing Toxic
Pollution**



ACTION PLAN #5

REDUCING AND PREVENTING TOXIC POLLUTION

All living systems use and recycle a variety of naturally-occurring chemicals and nutrients. Changing the normal balance of chemical concentrations in an ecosystem can jeopardize the health and reproductive capacity of the organisms in that ecosystem. Chemicals which induce such deleterious effects are called "toxics." Since 1940, more than 70,000 synthetic chemicals have been introduced to the marine environment. Many of these chemicals are toxic even in minute concentrations.

There are several classes of toxics in the marine environment. Those of greatest concern include:

Polycyclic aromatic hydrocarbons (PAHs)

PAHs are a class of organic compounds found primarily in fossil fuels such as oil and coal. These compounds enter the Bays from many different sources, including oil spills and runoff, car exhaust, worn tire rubber, and soot from backyard barbecues, to name only a few. Prolonged exposure to PAHs is believed to cause cancer and birth defects, as well as physiological damage.

Toxic metals

Copper, arsenic, lead, cadmium, mercury, silver, chromium, nickel, zinc, and other metals enter the Bays both from nonpoint sources such as urban runoff and point sources such as wastewater discharges. Although low concentrations of these metals occur naturally in the marine environment, elevated concentrations may endanger marine organisms. All metals are chemical elements, which means they cannot be destroyed or broken down. Once they enter the marine environment, they persist indefinitely.

Polychlorinated biphenyls (PCBs)

PCBs are a family of organic compounds used since the 1920s in electrical transformers, liquid coolants, flame retardants, lubricants, adhesives, caulking compounds, and various other products. They are believed to be highly carcinogenic. PCBs do not readily break down into less harmful chemicals and therefore persist in the environment for long periods.

Pesticides

Although many of the most harmful pesticides have been

banned in Massachusetts, many chemicals used during the 1950s and '60s still persist in the Bays. Less toxic compounds are still used extensively in agricultural areas to combat crop pests and in wetland areas to hold down mosquito populations, as well as on suburban lawns and golf courses. All of these eventually find their way to coastal waters.

Toxic contaminants enter the Bays through many routes: industrial and municipal waste, dredged material, atmospheric fallout, stormwater discharges, and nonpoint runoff, to name a few. In 1991, the Massachusetts Bays Program sponsored the first comprehensive survey of the sources of toxic contaminants in the Bays' ecosystem. This survey found toxic contamination to be most serious along the North Shore and in the vicinity of Boston Harbor, where industrial wastewater and urban runoff contain relatively high loadings of chemical contaminants. However, tracing the diverse origins of these contaminants is no easy task. Each toxic may have its own unique source. For instance, corroding water pipes are believed to be a major source of copper. Lead, on the other hand, seems to enter the marine environment mostly through atmospheric deposition.

However they enter the marine environment, toxic contaminants eventually settle out of the water column and come to rest on the ocean floor. The highest concentrations of contaminants are typically found in sediments close to shore, localized around a point source of pollution or in a tranquil depositional area. Most contamination is concentrated in the vicinity of urban areas or localized "hot spots."

Evaluating the fate and effects of chemical contaminants in the Bays is a complex task which requires an understanding of the contaminants' temporal and spatial distribution. After toxic contaminants become incorporated into marine sediments, invertebrates may accumulate the toxics and pass them along the marine food web. The rate of bioaccumulation depends on variables such as species feeding patterns, the nature of the contaminant, and the contaminant's persistence in the environment. Toxics tend to become more concentrated as they move up the food chain. As they accumulate toxics in their tissue, individual organisms may develop cancerous tumors or other diseases. Toxic contami-

nation has already been tied to disease in some commercially valuable species in Massachusetts Bays, including liver lesions and fin rot in flounder, and black gill disease in lobsters. Widespread disease could potentially cause declines in populations of sensitive species, alter foodweb interactions, and impact the marine ecosystem.

Human exposure to toxic pollution generally occurs indirectly, through consumption of contaminated seafood. The magnitude of the health risk is difficult to quantify because the effects of exposure do not immediately manifest themselves in an acute illness. Consumption of contaminated seafood probably raises the overall risk of cancer and neurological impairments in fetuses or children. However, because the effects may not be apparent for many years, it is difficult to definitively link consumption to impacts.

Even if the magnitude of risk is uncertain, management decisions still need to be made to protect public health and the health of the marine ecosystem from exposure to chemical contaminants. Federal and state authorities have already taken preliminary steps to regulate the chemically-contaminated fishery resources in Massachusetts Bays. The U.S. Food and Drug Administration (FDA), which regulates all seafood shipped across state lines, has set "action levels" or thresholds for chemical concentrations in all food products.

The U.S. Environmental Protection Agency (EPA) has established similar tolerance levels for pesticides. However, these action levels are based on average national consumption rates, and are not intended to protect local segments of the population whose seafood consumption may exceed the national average. Moreover, the FDA has not yet set action levels for many chemicals in Massachusetts coastal waters.

The Massachusetts Department of Public Health (DPH), with the assistance of the state Division of Marine Fisheries (DMF), supplements the work of these federal agencies. The state has issued two advisories concerning chemically-contaminated seafood. The first warns all segments of the population against eating the tomalley of lobsters harvested in Boston Harbor. The second advises certain high-risk segments of the population to avoid all seafood harvested in Boston Harbor.

Much work needs to be done in order to fully understand the sources of toxic contamination, its effects on the marine ecosystem, and its potential impact on human beings. While scientists work to resolve these uncertainties, action must be taken to reduce the amount of toxic pollution reaching the Bays. The following recommendations will move us in the right direction.

MUNICIPAL ACTION #5.1:

Municipalities should adopt and implement the following set of regulations to ensure the safe use, storage, and disposal of toxic and hazardous materials: 1) *Toxic and Hazardous Materials Regulation*, 2) *Underground Storage Tank Regulation*, and 3) *Commercial/Industrial Floor Drain Regulation*.

RATIONALE:

Leaking underground fuel storage tanks (USTs) and improper storage and disposal of hazardous materials have contaminated scores of drinking water supplies across the Commonwealth, and are a source of toxic contaminants to Massachusetts Bays. While federal and state regulations provide some measure of protection, they are not a substitute for strict oversight at the local level. For example, the State Board of Fire Prevention Regulations (527 CMR 9.00) that govern underground fuel storage specifically exempt farm and residential fuel oil tanks of 1,100 gallons capacity or less from construction/installation, monitoring, and tightness-testing requirements, even though these tanks can be a significant source of contaminants to the environment. Moreover, numerous small commercial and industrial establishments (gas stations, autobody shops, machine shops, furniture refinishers, etc.) house unauthorized floor drains which can discharge contaminants directly into the ground or a leaching facility, and many of these establishments often go largely unregulated.

RESPONSIBLE AGENT(s):

Boards of Health and Fire Departments would share most of the responsibility for this action, with assistance from the Local Emergency Planning Committee (LEPC) Coordinator, Building Inspector, and Plumbing Inspector. Technical assistance in drafting the recommended regulations is available from the Regional Planning Agencies, the DEP Division of Water Supply, and the DEP Division of Hazardous Waste.

IMPLEMENTATION STRATEGY:

The Board of Health and other local authorities cited above should evaluate the community's existing regulations pertaining to toxic and hazardous materials management, based on model regulations provided by the Regional Planning Agencies. Where existing regulations are found to be outdated or otherwise deficient, the Board of Health should adopt new regulations which empower the Board and

the Fire Chief to better track and control the siting, storage, and disposal of hazardous materials in the community. The new regulations can be stricter and more comprehensive than the corresponding state and federal regulations, so long as they do not conflict with the state and federal regulations. As an example of a stricter local provision, some municipal UST regulations call for the outright removal or intensive leak detection-testing of all underground storage tanks 20 years or older, regardless of tank size, use, or construction material.

As part of this process, local officials can provide facility owners and operators with helpful guidance materials on best management practices (BMPs) appropriate for their particular business. These guidance materials are readily available from DEP and OTA in the form of individual fact sheets which prescribe specific waste handling and storage practices for a range of business operations, such as autobody painting, furniture stripping, and commercial dry cleaning.

LEGISLATION REQUIRED:

If the recommended regulations are adopted as Board of Health regulations (rather than as general bylaws or ordinances), this action will require majority approval by the Board of Health following the issuance of a public notice and a public hearing. Adoption as general bylaws or ordinances will require town meeting or city council approval.

ESTIMATED COST:

The cost of drafting and adopting the recommended regulations should be minimal. Model regulations are available that can be adopted either in their present form or with minor modifications to reflect specific local needs. Assistance in drafting the regulations and establishing associated record-keeping systems is available from the Regional Planning Agencies.

POTENTIAL FUNDING SOURCE(s):

Local revenues

TARGET DATE:

1996/1997. This is a high priority action from a water quality standpoint and should be implemented by municipalities as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

Your area's Regional Planning Agency
DEP Division of Water Supply
(617) 292-5770
DEP Division of Hazardous Waste
(617) 292-5853
EOEA Office of Technical Assistance
for Toxics Use Reduction
(617) 727-3260

MUNICIPAL ACTION #5.2:

Municipalities should establish *Household Hazardous Waste Collection Programs* for difficult-to-manage hazardous products to ensure their proper disposal on a regular basis.

RATIONALE:

Households account for approximately 25% (35,000 tons per year) of hazardous waste disposal in Massachusetts, and discharge a variety of toxic chemicals into septic systems, sewers, and landfills. These chemicals are found in everyday household and yard products such as oven and tile cleaners, spot removers, wood stains and preservatives, and pesticides. Disposed of improperly, many of these contaminants ultimately reach ground and surface waters, where they endanger public health and the environment.

RESPONSIBLE AGENT(s):

Local Boards of Health and health departments will generally be responsible for this action, with assistance from local fire departments, public works departments, recycling committees, civic organizations, and citizens. Regional Planning Agencies can provide technical assistance in many phases of a collection event, including: selection of an appropriate collection site; preparation of the bid specification package; selection of a qualified hazardous waste contractor; and event promotion.

IMPLEMENTATION STRATEGY:

Until such time as permanent collection facilities are established in or near each community (or mobile collection facilities are available on a rotating basis), municipalities should sponsor annual household hazardous waste collection events for difficult-to-manage hazardous products. These are products, such as pesticides, that are not readily recycled and/or are highly toxic. The collection events are typically held in the spring or fall to coincide with home and yard cleanups, and provide an effective means for removing large quantities of potentially harmful household products. They also afford an opportunity to educate homeowners on the use of safer alternative products, and on the hazards posed by certain products, such as septic system cleaners that contain organic degreasers. For best results, the events should be held at convenient sites (large, centrally-located parking lots, for example) and should be widely publicized (press releases, flyers, cable t.v.) to maximize community participation. *Joint* sponsorship of events by neighboring communities can reduce costs significantly.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

Collection event costs vary widely, depending on the length (hours) and frequency of events, number of participants, types and volumes of wastes collected, and contractor's fee. For small to mid-size communities (5,000 - 25,000 residents) costs typically range from \$15,000 to \$25,000, of which \$4,500 - \$6,000 is the contractor's fixed fee for site setup. The remaining costs cover event publicity, and waste transport and disposal.

Cost savings can be achieved through: preventative consumer education, participant pre-registration, pre-screening of wastes to prevent the introduction of non-hazardous wastes, regionalization, and "Buy-A-Barrel" campaign contributions from sponsoring businesses and civic organizations.

POTENTIAL FUNDING SOURCES:

Local revenues, including fees on water, sewer, and municipal solid waste services; cash contributions from business and civic organizations; and modest "tipping" fee to participants.

TARGET DATE:

1996 and annually thereafter.

FURTHER INFORMATION:

For further information and assistance, contact:

Your area's Regional Planning Agency
EOEA Office of Technical Assistance
(617) 727-3260
DEP Division of Hazardous Waste
(617) 292-5853

DOE ACTION #5.3:

The Department of Education, in collaboration with the Massachusetts Community College System and with technical assistance from the Department of Environmental Protection, should develop and offer continuing education courses on hazardous materials management to create a pool of trained "HazMat Specialists" at the local level.

RATIONALE:

Communities are becoming increasingly concerned over the threats toxic and hazardous materials pose to their drinking water supplies and sewage treatment plants. Nonpoint sources of pollution are a particular problem. Leaking landfills and underground storage tanks, businesses using and storing hazardous materials, and even individual households are all recognized as potentially significant contributors of toxic contaminants to the environment. To address these concerns, many communities are adopting hazardous materials bylaws to help monitor the use, storage, and disposal of hazardous chemicals in the community. Unfortunately, the task of implementing these bylaws often falls on the shoulders of already overburdened health officers or other local officials who have little, if any, formal training in hazardous materials management. As a result, many of the bylaws are not being administered or enforced as effectively as they should be.

The availability of qualified HazMat specialists at the local level would help remedy this problem. Depending on the needs of the community, these specialists could be either paid employees (such as health agents or building inspectors), volunteer board members, or even private citizens. The latter could include retirees or graduate interns interested in serving their community. In addition to helping administer the bylaws, which often includes the difficult task of setting up and operating a comprehensive record-keeping system, the local HazMat Specialists could provide public outreach and education services. These specialists could assist users of hazardous materials, both residential and commercial, in identifying less-toxic alternatives and understanding proper management of hazardous chemicals in the home and the workplace.

RESPONSIBLE AGENT(s):

The Department of Education (DOE), assisted by the Department of Environmental Protection (DEP), would have primary responsibility for this action. DOE should engage the services of a professional curriculum specialist to: 1) develop a HazMat training course (or series of courses) to be offered through the state community college system; and 2)

develop an application process for interested colleges to apply for grants to operate the "HazMat Specialist" program.

Linkages with the Local Emergency Planning process (SARA Title III), Massachusetts Firefighting Academy training program, and Massachusetts Health Officers Association certification program should be explored.

IMPLEMENTATION STRATEGY:

Once a source of funding is developed, DOE should issue a Request for Proposals for a professional curriculum specialist. Components of the course should include basic environmental principles related to the protection of land, air, and water; the nature of chemicals used in small commercial operations and in households; public education tools and techniques; municipal inspection and enforcement strategies; and roles and responsibilities of federal, state and municipal environmental protection authorities. The second phase of program implementation would be training of instructors.

Federal job development and training programs aimed at minorities and senior citizens should be explored for possible linkages.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

\$100,000 (or less) per participating college. This would cover the cost of integrating the HazMat curriculum, training of instructors, administrative overhead, and preparation of instructional materials. Registration fees for course participants would not be covered.

POTENTIAL FUNDING SOURCES:

Massachusetts Department of Employment and Training (Job Training Partnership Act Program).

University of Lowell's Toxics Use Reduction Training
Program, funded through the Toxics Use Reduction Act.

Massachusetts Department of Education.

Environmental Education Grants Program, Environmental
Education Division, U.S. EPA.

FURTHER INFORMATION:

For further information and assistance, contact:

DEP Hazardous Waste Management Program
(617) 292-5853

TARGET DATE:

1998 and annually thereafter.

EOEA/MUNICIPAL/PRIVATE SECTOR PARTNERSHIP ACTION #5.4:

The Executive Office of Environmental Affairs, municipalities, and the business community should explore and form partnerships to facilitate the safe management of hazardous products, emphasizing reduced products use and recycling wherever possible.

RATIONALE:

The following preliminary actions are the result of recent discussions among representatives of the Executive Office of Environmental Affairs (EOEA) and the Massachusetts Bays Program, including the MBP's Business and Resource Users Group. While these actions are not developed as fully as the other actions in the CCMP, they are expected to be the subject of an ongoing dialogue between EOEA and MBP over the next year, and may be presented as more complete actions in future supplements to the CCMP.

State Actions (preliminary)

- The Executive Office of Environmental Affairs (EOEA) should develop a comprehensive plan for household hazardous waste (HHW) management to coordinate programs on a state-wide basis. The plan should develop comprehensive collection programs for wastes such as used oil, oil filters, antifreeze, car batteries, tires, household batteries, and paint, which form the bulk of the waste stream at HHW collections but can be handled more cost-effectively through tailored programs. The plan should include a strategy for other household hazardous wastes that are considered as priorities for collection due to their toxicity. This plan should refine existing programs, as well as provide guidance for establishing new program initiatives.
- The Commonwealth should encourage and assist in developing research initiatives into the public health and environmental effects caused by specific household hazardous products and chemicals. This research should be used to establish priorities for focusing HHW collection efforts.
- In cooperation with municipalities, regional governments, and the private sector, the Commonwealth should develop and promote public outreach and educational programs to encourage citizens to shift away from the use of hazardous products and to handle the household hazardous products that they do use in a safe manner. EOEA also should provide increased technical assistance, including a "how to" manual for the safe handling of specific types of HHW and a technical assistance packet for municipalities containing a list of available technical assistance information.

- EOEA should work with the Department of Environmental Protection (DEP) and the Department of Procurement and General Services (DPGS) to provide state contracts for the collection of used oil, oil filters, antifreeze, and paint products. In addition, EOEA should work with a battery manufacturer to provide collection services for lead acid car batteries collected by municipalities. These agreements would provide collection services to state, municipal, and regional government agencies at a low cost based on economies of scale.
- EOEA should use the Clean Environment Fund to provide additional equipment grants to help municipalities establish collection centers for automotive materials and paint products. These grants should be coupled with training and technical assistance to ensure proper collection and handling procedures.
- The Commonwealth should encourage development of private sector collection sites by easing regulatory requirements for businesses which generate hazardous wastes such as used oil.
- The Commonwealth should improve options for very small quantity generators to safely dispose of hazardous wastes through existing collection programs and by exploring new collection mechanisms such as private sector collection centers.
- EOEA should establish a working group to mobilize and promote business community involvement in carrying out these actions, using the MBP Business and Resource Users Group as the vehicle to accomplish this.

Municipal Actions (preliminary)

- Municipalities should develop tailored programs to collect readily recyclable wastes, such as used oil, oil filters, antifreeze, lead-acid car batteries, tires, household batteries, and paint products, on a regular basis. Collection of these wastes should be the cornerstone of municipal household hazardous waste (HHW) collection programs, even if held on only a periodic basis.
- Municipalities should develop "automotive recycling centers", which would handle all major automotive waste products, including oil filters, antifreeze, tires, and

lead-acid car batteries. Ideally, municipalities should collect all four of these materials. The costs of collecting all four materials may range anywhere from \$750 - \$1,500, depending on market conditions, transporter's fees, and amounts of the material collected.

- Municipalities should consider purchasing on-site antifreeze recycling systems as an alternative to hiring a contractor to collect antifreeze, especially if the municipalities have large municipal vehicle fleets. Use of on-site recycling systems can reduce the need to purchase new antifreeze.
- Municipalities should apply for state grants to purchase used oil collection tanks and paint storage sheds.
- Municipal and regional governments should minimize reliance on one-day HHW collection events that indiscriminately collect and dispose of all household wastes perceived as "hazardous" without regard to the actual risk such wastes present. HHW collection programs should be used only for specific hazardous wastes, such as pesticides, that cannot be safely handled through other, more efficient and cost-effective mechanisms.

When one-day collection events continue to be necessary to provide for safe disposal of household hazardous waste, municipalities should take advantage of competitive market dynamics to negotiate agreements for less costly collection services and use model RFPs offered by the state.

- Municipalities should work with the private sector to establish permanent collection mechanisms, hold collection events on a multi-town or regional basis, and emphasize reduction in toxic materials use.
- Municipalities and the Commonwealth should amend their procurement processes to purchase recycled and reused materials such as re-refined oil, recycled antifreeze, recycled paint, recycled paper products, recycled construction materials, and other products made from recycled content. This strategy will help "close the recycling loop" for these materials and reduce local collection and processing costs for recyclables. Municipalities should work with the Department of Procurement and General Services to take advantage of existing and future state purchasing agreements for recycled products.

EPA ACTION #5.5:

The Environmental Protection Agency (EPA) should reduce and prevent toxic pollution through targeted National Pollutant Discharge Elimination System (NPDES) permitting of significant discharges in the Massachusetts Bays; in particular, oil tank farms on Chelsea Creek and the Island End River.

RATIONALE:

Several classes of toxic contaminants exist in the marine environment as a result of stormwater runoff and point source discharges, atmospheric deposition, and dredging of contaminated sediments. Toxic contamination causes direct impacts to marine life, as evidenced by liver lesions in flounder. Human health impacts from toxic contamination in the marine environment also can occur, typically through the consumption of contaminated seafood.

A particular class of toxic contaminant prevalent in the Massachusetts Bays is known as "polycyclic aromatic hydrocarbons" or PAHs. PAHs are a component of many grades of crude and refined oils (e.g., gasoline). While many concentrated "hot spots" of PAH contamination exist within the Massachusetts Bays, two tributaries of Boston Harbor - Chelsea Creek and the Island End River - are hot spots of particular note. Numerous oil storage facilities are situated along the banks of these waterways, due to their proximity to material handling facilities and shipping channels. These so-called "tank farms" are thought to be sources of PAHs for two reasons. First, each tank is designed to hold condensation, small leaks, and overflows in a storage area at the base of the tank. This storage area is sometimes drained directly to the nearest waterway after only limited pretreatment or remediation. Second, the paved areas surrounding the tanks routinely have significant quantities of oil on their surfaces due to releases which occur when oil is transferred to or from the tank. Accordingly, the stormwater runoff from these areas may contain concentrations of PAHs and other petroleum hydrocarbons.

Under the NPDES program, industrial land uses which discharge, via point sources, stormwater runoff or other types of releases into wetlands, waterways, and water bodies, are required to implement treatment and preventive best management practices (BMPs) through a permitting process in order to maintain the quality of the receiving waters. This is the same compliance effort targeted for stormwater discharges in the lower Charles River Basin, as described in EPA Action #4.5.

RESPONSIBLE AGENT(s):

NPDES permitting and compliance for the oil tank farms in

the targeted areas is the responsibility of the EPA, with continued coordination with the Massachusetts Department of Environmental Protection (DEP).

IMPLEMENTATION STRATEGY:

No major organizational efforts are needed to implement this recommendation in the specified areas, since EPA staff resources dedicated to the NPDES program will be redirected to the Chelsea Creek and the Island End River industrial discharges, in coordination with Massachusetts DEP.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

Minimal, since the recommended action will be carried out by EPA staff who are already funded by the agency's operating budget.

POTENTIAL FUNDING SOURCE(s):

Agency operating budgets.

TARGET DATE:

Ongoing.

FURTHER INFORMATION:

For further information and assistance, contact:

EPA - New England
(617) 565-4422

OTA ACTION #5.6:

The EOEA Office of Technical Assistance for Toxics Use Reduction (OTA) should perform on-site assessments and provide instructional materials to help businesses and industries in the Massachusetts Bays region reduce the use of toxic substances.

RATIONALE:

Under the Toxics Use Reduction Act of 1989, over 600 Massachusetts companies must develop and implement pollution prevention plans, and *all* hazardous waste generators must adopt waste minimization plans. OTA, a non-regulatory state agency, was created to work cooperatively with business and industry to meet the statewide goal of a 50% reduction in toxic wastes by 1997, and to make continued progress thereafter. This goal is to be achieved through a promising new approach to the management of toxic substances called "Toxics Use Reduction", or TUR.

TUR includes a variety of changes in production processes and practices, all of which reduce or eliminate the generation or use of toxic substances without increasing risk to workers or consumers. TUR differs from more traditional approaches to industrial pollution in that it refocuses attention away from the treatment and disposal of toxic emissions at the *end* of the manufacturing process, and toward minimization or elimination of toxic materials used *during* the process.

Because TUR prevents toxic pollution at its source, rather than merely treating it once it has been created, it represents the safest and most environmentally responsible approach to managing industrial toxics. It also offers powerful economic incentives to industries which employ it. Indeed, against the backdrop of soaring treatment and disposal costs and the liability exposure associated with the use of hazardous materials, TUR makes increasing sense from a purely *economic* standpoint.

To date, OTA has held over 50 TUR workshops throughout the state, worked closely with several hundred Massachusetts businesses, and provided direct on-site consultation and viable TUR recommendations to more than 60 firms. Nevertheless, many commercial and industrial facilities have not yet availed themselves of OTA's free (and confidential) technical assistance, and numerous opportunities exist for further progress in toxics use reduction in the workplace.

Recently, in an effort to maximize these opportunities, OTA joined forces with over 80 businesses in the Merrimack Valley region to establish a Business Environmental Network. This network brings diverse industries together to promote business awareness on environmental issues and

regulatory requirements, and to share information and expertise on pollution prevention technologies. Businesses in other regions in the Commonwealth, including coastal areas, have expressed interest in either expanding this existing network or forming additional networks, and have requested OTA's assistance to accomplish this.

RESPONSIBLE AGENT(s):

OTA will be responsible for initiating and implementing industry outreach and technical assistance actions. Expansion of the existing Business Environmental Network or establishment of additional networks will be pursued by OTA in collaboration with local businesses.

IMPLEMENTATION STRATEGY:

OTA will implement its TUR program by offering the following non-regulatory services at no charge:

- Perform on-site assessments designed to help businesses identify TUR opportunities and learn about alternative processes and technologies applicable to their particular operations.
- Respond to telephone and written requests for general information about TUR and specific information about the legal requirements of the Toxics Use Reduction Act.
- Sponsor conferences, workshops, seminars, and trade fairs to disseminate information about TUR technologies.
- Promote alternative manufacturing processes that reduce toxic substance use, hazardous waste generation, toxic air emissions, and wastewater discharge.

To support these efforts, OTA will develop and broadly disseminate materials that promote the concept and practice of pollution prevention. One such publication, OTA's "*A Practical Guide to Toxics Use Reduction*," provides step-by-step guidance on all aspects of TUR planning and implementation.

Overall, OTA's strategy will be directed not to merely

encouraging individual, short term TUR projects, but rather to helping businesses launch and sustain long term in-house TUR programs.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

The cost of the TUR program will be borne by OTA, with possible grant assistance from EPA for the Business Environmental Network component.

POTENTIAL FUNDING SOURCES:

Grant from EPA Waste Management Division.

TARGET DATE:

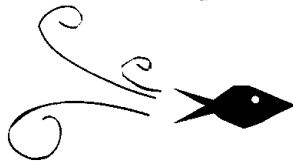
1996 and annually thereafter.

FURTHER INFORMATION:

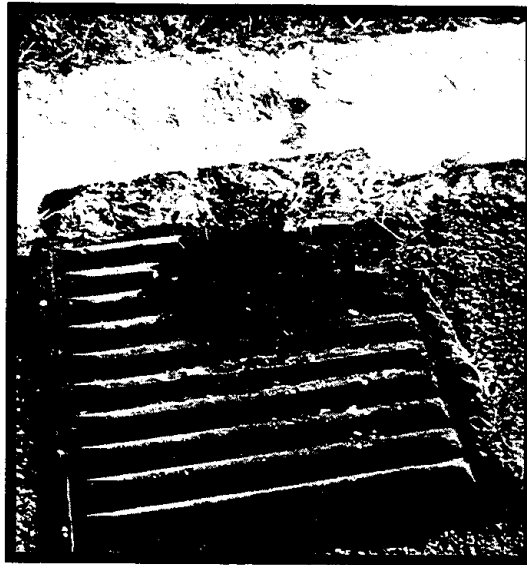
For further information and assistance, contact:

EOEA Office of Technical Assistance for
Toxics Use Reduction
(617) 727-3260

chapter V



**Reducing and
Preventing Oil
Pollution**



ACTION PLAN #6

REDUCING AND PREVENTING OIL POLLUTION

Few environmental catastrophes do more damage to marine resources or cause more public outrage than a large oil spill. Six years after the *Exxon Valdez* spill in Alaska's Prince William Sound, few people have forgotten images of oil-soaked beaches and poisoned wildlife. Many people do not realize, however, that large spills and offshore blowouts account for only a small percentage of the oil polluting our coastal waters. In fact, most of the approximately four million tons of oil added each year to the world's marine environment comes from small spills and stormwater runoff.

Petroleum is the most common of several types of fossil fuel hydrocarbons -- "oil" -- which find their way into Massachusetts Bays. These hydrocarbons enter the Bays from diverse sources. In addition to accidental spills, fossil fuel hydrocarbons enter the Bays from industrial and municipal wastewater, stormwater runoff, boats, and creosote-treated wood pilings.

Oil pollution may adversely affect much of the marine environment, but is especially threatening to stationary plants, sensitive species, and organisms in early life stages. Some economically and ecologically significant resources, such as shellfish and eelgrass beds, are especially vulnerable to oil pollution. Immediately after a spill, these resources generally experience a high mortality, and even those organisms that survive often suffer short-term stress and impaired metabolism. Residual toxic effects on individuals or populations may be evident long after the spill has dissipated. Damage is especially acute if the spill reaches a confined embayment, where slow flushing, prevailing winds, and on-shore currents keep the oil concentrated.

Although the Massachusetts Bays have so far avoided any catastrophic spills, tankers and barges carrying petroleum products through the Port of Boston, the Cape Cod Canal, and Salem Harbor pose a constant risk. The federal government has developed a broad regulatory framework to monitor and mitigate this risk. The keystone of this framework is the Oil Pollution Act of 1990, a comprehensive piece of legislation which addresses issues of liability and compensation,

vessel manning and training, communication system requirements, and design specifications for tankers, including the compulsory phasing in of double hulls. The Act also requires the federal government to develop Area Contingency Plans and regularly update the National Contingency Plan.

The party responsible for an oil discharge that affects navigable waters is required to adequately respond under the Federal Water Pollution Control Act (FWPCA), as amended. The Coast Guard On-Scene Coordinator (OSC) and the State OSC from the Massachusetts Department of Environmental Protection will ensure that the responsible party adequately responds to such spills. If a response is not adequate, the Coast Guard and the State will direct response actions. The spiller is liable for all money spent by the Coast Guard or State during a response. The Coast Guard owns oil spill containment and recovery equipment and can call upon a spill response Strike Team for additional assistance, but will rely primarily on contracted resources. The spiller also is required to provide compensation to restore or replace natural resources damaged by a spill.

Nonpoint sources of oil pollution are less dramatic -- but more insidious -- than accidental spills. The culprits in this case are not giant corporations or irresponsible sea captains, but unthinking individuals. Lots of them. Countless car owners, perhaps ignorant of the harm they are doing, pour used motor oil down storm drains or throw it in their garbage to avoid the inconvenience of disposing of it properly. Eventually, most improperly disposed oil will pollute groundwater and/or surface waters, including coastal embayments.

Mitigating oil pollution in the coastal zone will require action aimed at both point and nonpoint pollution sources. Because spills cannot realistically be eliminated, an effective strategy for controlling this source of contamination should include a combination of prevention, early response, and mitigation. Nonpoint sources will be more difficult to control, but there are ways to put a dent in the problem. The recommended actions which follow are an effective starting point.

MUNICIPAL ACTION #6.1:

Municipalities should establish, maintain, and promote the use of *Used Motor Oil Collection Facilities* to ensure the proper permanent collection and management of used motor oil from do-it-yourself oil changes.

RATIONALE:

According to a 1996 study conducted for the Executive Office of Environmental Affairs (EOEA), 2.9 million gallons of used motor oil are generated annually in the Commonwealth by do-it-yourself oil changers. EOEA estimates that up to 80% of this amount may be disposed of improperly by dumping it on the ground, throwing it in the trash, or pouring it down a storm drain. Used motor oil contains petroleum hydrocarbons and heavy metals which can contaminate drinking water supplies and living resources habitat. While the Massachusetts Used Oil Retention Act (MGL Ch. 21, s52a) allows the return of used motor oil to the place of purchase, the requirement that do-it-yourselfers retain their receipts, the reluctance of small convenience stores to collect used oil, and inadequate state enforcement have combined to severely limit the effectiveness of this measure. Most used motor oil continues to be disposed of improperly due to the lack of convenient, *local* collection facilities.

Due to the many concerns expressed over the current collection law, EOEA is working with interested parties to develop new legislation. Legislation based on a proposal developed by EOEA will be introduced by the Natural Resources and Agriculture Committee during the 1996 legislative session. A consensus on this proposal has been reached by the following groups:

- Massachusetts Petroleum Council;
- American Petroleum Institute;
- Retailers Association of Massachusetts;
- Environmental League of Massachusetts;
- MassPIRG;
- New England Service Station and Automotive Repair Association; and
- Convenient Automotive Services Institute.

If passed, this legislation will make significant improvements in the collection of used oil from do-it-yourself oil changers (DIYers). The legislation would make current collection requirements more flexible and pay recycling incentives to collection centers and to DIYers who return used oil for recycling. It also would provide needed resources (through payments made by motor oil manufacturers) for public education programs, reimbursement of collection centers for costs of disposing of contaminated oil, and expansion of

current Department of Environmental Protection (DEP) municipal recycling grants for used oil storage tanks.

RESPONSIBLE AGENT(s):

Local Public Works Departments and Boards of Health will be responsible for this action, with input and assistance from the Fire Departments and recycling committees. Assistance on siting and equipment requirements, as well as facility operation, is available from the DEP Division of Hazardous Waste and the Regional Planning Agencies. The MWRA offers guidance to member communities in the MWRA service area.

IMPLEMENTATION STRATEGY:

The above departments and boards should consult recent DEP and EPA guidance documents on used oil collection. These provide helpful information on the steps communities can take to establish and operate a successful used oil collection facility. Topics include:

- Selecting and preparing a suitable collection site;
- Obtaining state and local approvals;
- Staffing and operating the site;
- Purchasing collection equipment (e.g., above-ground, double-walled used oil storage tank);
- Publicizing the facility and educating the public; and
- Contracting with a licensed used oil transporter.

Municipalities are responsible for management of the collected oil from municipality-run facilities. Most used oil transporters will remove the collected oil at no or low cost (less than 20 cents/gallon). As an alternative, municipalities may, with DEP authorization, burn the used oil in an approved space heater during the heating season. Some communities are doing this as a means of defraying the cost of heating their DPW garages and other municipal buildings.

Wherever feasible, municipalities also should encourage the establishment of private oil collection facilities by

appropriate local businesses, such as gas stations and marinas.

LEGISLATION REQUIRED:

Construction and operation of a municipal used oil collection facility requires the prior approval of the local fire and building departments and of the DEP Hazardous Waste Compliance office. In addition, either a state (DEP) or federal (EPA) identification number must be obtained to allow tracking of the movement of the used oil from the municipal collection site to its final reuse or disposal destination.

ESTIMATED COST:

Oil collection program costs can vary, depending on facility size, hours of operation, staffing needs, and amount of oil collected/removed. In general, however, the costs are low to moderate and should not prove prohibitive for any community. Based on existing collection programs, average costs are as follows:

Site preparation (one-time cost)	- \$2,500 - \$3,000
Oil storage tank (one-time cost)	- \$2,000 - \$4,000*
Site attendant (assumes on-duty DPW staff)	- 0 -
Transporter Disposal Fee (annual) (assumes 1,000 gal. @ \$0.20/gal.)	- \$ 0 - \$200
TOTAL (first year)	\$5,000 - \$7,500

* Note: EOE/DEP grants have paid for over 50 municipal tanks in the past two years.

POTENTIAL FUNDING SOURCES:

DEP recycling equipment grants; local revenues; modest "tipping" fee to participating oil changers; area business and service organization sponsors.

TARGET DATE:

1997/1998. This is a high priority action from a water quality standpoint and should be implemented by municipalities as soon as possible.

FURTHER INFORMATION:

For further information and assistance, contact:

Your area's Regional Planning Agency
DEP Div. of Hazardous Waste (Regulations)
(617) 292-5853
DEP Div. of Solid Waste (Grants)
(617) 292-5984
MWRA Toxic Reduction & Control Dept.
(617) 242-6000

DEP ACTION #6.2

The Department of Environmental Protection, in collaboration with the U.S. Coast Guard, EPA, and NOAA, should implement the recently-developed *Policy on the Use of Oil Spill Chemical Counter Measures (Dispersants)* to protect coastal resources from the adverse effects of oil spills.

RATIONALE:

There are many ecologically, economically, and culturally-important resources along the Massachusetts coast that may not always be adequately protected from spilled oil by conventional physical cleanup methods, such as booming and skimming. Under certain spill scenarios, these conventional methods would either be infeasible or would not afford the desired level of protection for the particular resources at risk. When conventional methods are not possible or appropriate, the use of chemical dispersants may be required. Chemically dispersed oil remains for a time in the water column (where it is eventually degraded), but because it does not beach or sink into the sediments, its overall persistence in the marine environment is generally reduced.

Recently, an environmentally sound policy governing the use of chemical dispersants in Massachusetts coastal waters, developed by the U.S. Coast Guard (with assistance from other federal and state agencies, including DEP), was accepted by EOEA and incorporated into the state's Area Contingency Plans for use during oil spill response.

RESPONSIBLE AGENT(s):

The DEP Bureau of Waste Site Cleanup will be responsible for implementing this policy, with assistance from DEP's Bureau of Resource Protection (BRP), Office of Watershed Management (OWM). The OWM will continue to provide guidance on environmental issues that need to be addressed in implementing the policy, and is taking the lead in acquiring pertinent information from state and federal resource agencies (DFWELE, CZM, USFWS, USCG, EPA, and NOAA) and private marine science organizations, such as the New England Aquarium and the Center for Coastal Studies.

IMPLEMENTATION STRATEGY:

Now that the policy is developed, DEP will continue to work with the U.S. Coast Guard Area Committees, EPA, and NOAA to develop an effective implementation strategy.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

DEP staff time.

POTENTIAL FUNDING SOURCE(s):

DEP's annual operating budget.

TARGET DATE:

1996 for developing an implementation strategy.
Implementation of the policy on dispersants will be ongoing.

FURTHER INFORMATION:

For further information and assistance, contact:

DEP Bureau of Waste Site Cleanup
(617) 292-5852

USCG ACTION #6.3:

The U.S. Coast Guard, in collaboration with other federal, state, and local agencies, should continue to update and implement the Massachusetts coastwide *Area Contingency Plans* to assure the rapid and effective response to discharges of oil and hazardous substances into the marine environment.

RATIONALE:

Despite increasingly rigorous oversight and enforcement of pollution prevention regulations by the U.S. Coast Guard and other regulatory authorities, occasional oil and hazardous materials pollution incidents continue to occur. The potential for such incidents is ever present when petroleum products and hazardous materials are moved or stored in bulk quantities on or near the water. In recent years, oil shipments have increased, and tank vessels and shoreside terminals have grown in size and capacity. Over the last decade alone, the Coast Guard has responded to dozens of significant oil spills in the Massachusetts Bays region. Fortunately, none of these was a *major* discharge (over 100,000 gallons). Recent oil spills of note in the Metro Boston area include the following:

- In May 1991, the tankship *DELPHINA*, en route to the Citgo Oil terminal in Braintree, struck a rock in the Weymouth Fore River. The ship's #1 and #2 cargo tanks ruptured, spilling 16,000 gallons of No.2 fuel oil into the river.
- In July 1987, 13,800 gallons of insulating oil leaked into the Mystic River through a corroded electrical conduit at Boston Edison's Mystic Station.
- In December 1991, the tankbarge B-NO-105 leaked 4,200 gallons of No.4 fuel oil into the Chelsea River.
- In February 1987, 1,000 gallons of No.6 oil was discharged into the Mystic River from a storage tank at Boston Edison's Mystic Station. Tank #3 was being loaded from Exxon Everett when a meter malfunctioned, overfilling the tank. The spilled oil flowed into the Mystic River through nearby storm drains.
- In March 1986, 1,000 gallons of No.4 oil leaked into Boston Harbor from an underground oil tank at the Hoffman Building, Boston.

These and other oil pollution incidents underscore the need for a rapid, coordinated, and effective response to potentially harmful releases of oil and hazardous materials into the marine environment. To address this need, the U.S. Coast

Guard, in collaboration with the Department of Environmental Protection and designated Area Committees, has been developing a coordinated response capability, and recently completed a two-volume comprehensive oil spill contingency plan -- *Area Contingency Plan for Oil and Hazardous Substance Spills and Releases* -- for the Massachusetts coast. One volume of the *Area Contingency Plan (ACP)* covers the coast from Salisbury to Plymouth (Manomet Point); the second volume covers the remainder of the coast from Plymouth to the Rhode Island border, and includes Cape Cod and the Islands.

RESPONSIBLE AGENT(s):

The U.S. Coast Guard Marine Safety Office, the Department of Environmental Protection, and designated Area Committees will share the responsibility for planning, developing, and implementing incident response actions. The Area Committees serve as "planning and preparedness" bodies, and are comprised of experienced environmental and emergency response representatives from a broad range of federal, state, and local agencies. Advising and assisting the Area Committees are facility owners/operators, shipping company representatives, cleanup contractors, environmental consultants, environmental advocates, and concerned citizens.

IMPLEMENTATION STRATEGY:

The first iterations of the two *Area Contingency Plans (ACPs)* were recently released, and will be reviewed and updated annually through 1997, and then every 5 years thereafter. The *ACPs* prescribe specific notification and response procedures that are to be followed by the Federal and State On-Scene Coordinators, the "responsible party", and others when responding to a spill or discharge from a vessel, an offshore facility, or an onshore facility operating in or near the coastal zone. The *ACPs* are intended to cover spills of all sizes and, when implemented in conjunction with the *National Contingency Plan*, "shall be adequate to remove a worst case discharge of oil or a hazardous substance, and to mitigate or prevent a substantial threat of such a discharge...". The plans identify available resources and prescribe response

procedures for all aspects of a spill incident, including:

- Initial notifications and subsequent communication;
- Identification and mobilization of response personnel and equipment;
- Identification of launching and staging areas;
- On-water mechanical recovery of pollutant(s);
- Cleanup of shoreline;
- Identification and protection of ecologically and economically sensitive areas;
- Identification and protection of wildlife;
- Assessment of damage to, and restoration of, natural resources;
- Training requirements;
- Site safety and health procedures; and
- Media interaction and community relations.

To assist responders in the protection of ecologically-sensitive resources, the *Area Contingency Plans* describe and map the locations of each community's shellfish beds, anadromous fish runs, endangered species habitat (piping plover nesting sites, for example), and other sensitive natural resources. Derived from the coastal atlas entitled "Sensitivity of Coastal Environments and Wildlife to Spilled Oil--Massachusetts", prepared by Research Planning Institute, Inc., under contract to NOAA's Office of Oceanography and Marine Services, this information will be updated and refined as additional living resources data become available.

To assess the effectiveness of the *Area Contingency Plans*, the Coast Guard and DEP will conduct periodic drills of spill response capabilities. These drills are expected to include participation by federal, state, and local emergency response authorities, owners and operators of vessels and facilities in the area, and private cleanup contractors.

LEGISLATION REQUIRED:

New legislation is not required.

ESTIMATED COST:

Not applicable.

POTENTIAL FUNDING SOURCE(s):

U.S. Coast Guard.

TARGET DATE:

The first iterations of the *Area Contingency Plans for Oil and Hazardous Substance Spills & Releases* for the Massachusetts coast were printed and distributed in 1994. These plans will be reviewed and updated annually until 1997, and then every 5 years thereafter. Exercises to test response preparedness will be conducted by the Coast Guard as deemed necessary.

FURTHER INFORMATION:

For further information and assistance, contact:

U.S. Coast Guard Marine Safety Office
(617) 223-3000
DEP Bureau of Waste Site Cleanup
(617) 292-5500
